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ART. I.—*Specimen of the Burmese Drama, translated by* J. SMITH, Esq. *communicated by* C. A. BLUNDELL, Esq. *Commissioner, &c., Moulmein.*

MY DEAR SIR,—I have the pleasure to send you a translation of a play, which notwithstanding its trifling vein, may attract the notice of the curious, as exemplifying the popular tone of the Burman drama. The Ramadzat, (Ramahyana) and other ancient fabulous histories, form the groundwork of nearly all the favourite plays, the outline of the story being merely preserved, while the language of the play depends as much upon the fancy of the performer as the taste of the audience. Each company is presided over by a teacher or manager who drills the actors in their tasks from rough notes which contain only the songs and the substance of the parts assigned to each performer. In every play, without perhaps a single exception, the following characters are represented—a King, a Queen, a Princess, a Minister of State, a Huntsman, and some kind of Monster. The female characters are usually personated by men, it being considered indecorous in a woman to appear as an actress. I have to plead as an apology for the unpolished style of this translation, the acknowledged difficulty of turning the dialogue of a play into a foreign dress; moreover the original, which was written from the mouth of an actor, was imperfect and ill-written. I believe there are books in the palace at Umerapooree, containing the proper reading of all the approved plays and the costumes of the characters, which are placed near the

members of the royal family whenever they call their companie before them, but I have not been able to discover any work of th description here. Yours sincerely,

J. SMITH.

To C. A. BLUNDELL, ESQ.

The Argument.

The nine princesses of the city of the silver mountain, which separated from the abode of mortals by a triple barrier (the first bein a belt of prickly cane, the second a stream of liquid copper, and th third a *Beloo,* or devil) gird on their enchanted zones, which giv them the power of traversing the air with the speed of a bird, an visit a pleasant forest within the limits of the south island (earth. While bathing in the lake, they are surprised by a huntsman, wh snares the youngest with his magic noose, and carries her to th young prince of Pyentsa, who is so much struck by her surprisin beauty, that he makes her his chief queen, though he has but latel been united to the daughter of the head astrologer of the palac Being obliged soon after to take the field against some rebels, th astrologer seizes advantage of the prince's absence to misinterpre a dream, which the king calls upon him to explain; and declare that the evil spirit, whose influence is exerting itself against th king's power, is only to be appeased by the sacrifice of the beautifu Mananhurree, who has supplanted his daughter in the young prince' affections. The prince's mother hearing of the offering about to b made, visits the lovely Mananhurree and restores to her the enchante zone which had been picked up on the shore-edge of the lake by th huntsman, and presented by him to the old queen. The princess imme diately returns to the silver mountain; but on her way thither, sh stops at the hermitage of a recluse, who lives on the borders of th delightful forest before mentioned, and gives to the old man a rin and some drugs, which confer the power upon the possessor of them of entering the barrier and passing unharmed through its dangers The young prince having put an end to the war, returns to the cit of Pyentsa, and finding his favourite queen gone, he instantly sets fortl in quest of her. Having come to the forest, the appearance of whic astonishes and delights him, he dismisses his followers and visits th hermit, who delivers to him the ring and the drugs; he then enter the frightful barrier, and after meeting with many adventures, arrive at the city of the silver mountain, and makes known his presence t his beautiful bride by dropping the ring into a vessel of water, whic one of the palace damsels is conveying into the bath of the princess.

PERSONS.

The King of Pyentsa.
The King of the city of the silver mountain.
Thoodanoo, the Prince of Pyentsa.
A skilful Huntsman.
An Astrologer.
A Hermit.
The Queen of Pyentsa.
Mananhurree, the daughter of the King of the silver mountain, nd wife to Thoodanoo.
Noblemen, Generals, Guards, Ladies of the Palace, &c., &c.

PYENTSA.

ACT.

Scene 1st.—*Four Noblemen sitting in the Palace of Audience.*

1*st Noble.* My lords, let us not be false or neglectful to our oyal master, to whom we have so many times sworn allegiance; we ear the weight of government on our shoulders, and constitute the trength of the country,—How shall we conduct affairs, so as to extend is authority, and benefit the state?

2*nd Noble.* True, my lords; let me explain to you whence our oble monarch sprung. In the distant beginning, after the earth had een destroyed successively by fire, by wind, and by water, the lily vhich sprung from its bosom blossomed, and produced fine embryo eities, on which account the celestial beings bestowed upon this ystem the title of Battakat. The various incidents that have occurred from first to last, among the four divisions of the human race, are oluminously recited in the 49000 volumes of the History of Kings, ut I will merely give you a sketch. The nine beings who descended from the visible heavens, having eaten of the fragrant earth, peopled it after the manner of mortals;—in process of time, the inhabitants began to use deceit towards each other, to pillage, to steal, and to trive amongst themselves continually; and in order to put an end to hese calamities by instruction and discipline, the embryo deity Mahathamata came, and was hailed by the voice of the whole people. This was the first.

3*rd Noble.* When the millions of worlds had sunk under the influence of fire, air, and water—when the four grand divisions of the creation had been rent asunder—when the system had been again restored, and set in motion—the emerald-leaved lily sprung up, and gave forth from each of its fine blossoms the eight articles of clerical

use; then the beings of the celestial regions understanding the sign regarding the five embryo deities, called this world on which we live Batta (kat).—Is it not so, my lords?

4th Noble. My friends; in the palace of audience, the thirty-three images of superior beings and the images of lions are keeping watch over the throne—the gold, the silver, the emeralds, the flowers, the sapphires, the topazes, and the rubies, are glittering among the other emblems of royalty—the umbrella of state is being spread—the noblemen are in attendance in their robes and helmets—the sovereign of the golden palace is arraying himself in his royal habiliments—the procession will soon be formed to the music of the silver gong, the golden bell, and the celestial harp and lute, and issue forth headed by the four grand divisions of the royal army, marching to the sound of the martial drums;—Let us therefore listen in silence for the warning of the five silver gongs.

[*The royal procession enters.*

King. From the period when the system was destroyed by fire, air, and water, and again renewed, the dynasty which has produced five valorous monarchs has descended unbroken to me, the sovereign of the south island: Are the people happy in the remotest hamlet of my possessions?

Noble. Oh, wearer of the jewelled crown, who unfurleth the royal umbrella, and sitteth on the throne, guarded by rows of lions the hundred subject kings are in attendance with their daughters.

King. Represent to the sun of the world, truly and quickly, what you have to say.

Noble. Oh, king of the universe, whose merit is matured whose glory is increasing; whose august coronation has been celebrated; whose merchants and rich men go hither and thither under the royal protection; whose markets, rivers, rivulets, and lesser streams are crowded with people, canoes, and boats passing to and fro; whose royal staff being set up is surrounded by thousands of people going and coming; whose officers of customs, guards, and ferry men keep watch at the landing places—the Governor of the sea-war provinces sends a dispatch to the golden city, the contents of which shall be truly conveyed into the royal ear.

ACT.

SCENE 1st.—*City of the silver mountain. The nine princesses in the palace with their attendants.*

Princesses. Shory Tsa! Shory Phee!—ye wise waiting women who live under the shadow of the single pillared abode of royalty; come with us to the country of Pyentsa.

Scene 2nd.—*The grove on the borders of the country of Pyentsa.*

SONG.

Oh, bright are the flowers that carpet this vale,
And yield their sweet breath to the murmuring gale;
Bright flowers!—fragrant zephyrs!—how sweet, 'tis to rove,
In this Eden of pleasure—this garden of love.

The Princesses having taken off their enchanted zones, bathe themselves in the lake.

[*Enter Huntsman.*

Hunts. Now, skilful ranger, enter thou the dense forest, and try to discover where the beasts of the chase are most numerous. Let me go quickly, but cautiously.—Ah! what abundance of hares, elks, elephants, leopards, tigers, wild cows, bisons, and bears; there are harpies too, and unicorns, swans, *huoungs*, peacocks, and monkeys frisking about from place to place. Well; this is indeed a wonderful place.—[*He discovers the Princesses bathing.*] Ah! what creatures are these? Mortals, or celestials?—I must instantly entrap one of them with my magic noose, and ascertain what they really are.—[*He casts the noose, and snares Mananhurree, the youngest.*]

Manan. Oh, my royal sisters! save me, save me.

Hunts. Tell me, maiden, art thou a mortal, or a being of a superior order? Speak quickly, I pray you, and relieve me from my doubts.

Manan. I am the daughter of the king whose palace is in the city of the silver mountain, and came hither with my companions to play. Release me, for I am afraid.

Hunts. If so, I shall have my fortune made, for I will carry you this moment to the court of Pyentsa, sweet maiden, and present you to the young prince.

[*Music.*

Scene 3rd.—*Pyentsa. The palace.*

Enter Huntsman leading in the young Mananhurree to the Prince.

Hunts. Oh, prince, the lord of life and wealth; having but just now snared a palace-fostered maiden of a delicate and gentle form, I have brought her without delay to the golden foot.

Prince. [*To Manan.*] Be not concerned, sweet palace-born child, I could exist with you for ever. Wait; I will hasten to my royal sire and petition him to let me make you my chief queen.

Manan. Do with me, my lord, as you say.

ACT.

SCENE 1st.—*The Hall of the Palace. King, nobles.*

King. Nobles of the palace!

Noble. Lord!

King. Why fails the prince Thoodanoo to come into the presence?

Noble. Oh, ruler of a hundred subject kings,—whose light is like the sun of the universe; he has but even now wedded the daughter of the philosopher Naythoda. The governor of Setang, and the chiefs of Siam and Cochin-China, who have heretofore annually brought tribute, and presents of ingots of gold and silver, white and red cloths, velvets, bales of cloths, gold and silver lace, and gold and silver flowers, have now failed in their duty. Nor is this the limit of their folly; they are making encroachments upon the frontier, and in the pride of their hearts are destroying the villages, and oppressing the people. The confusion which they have created is so great that the inhabitants are afraid to remain on the frontier; an ambassador has only now reached from the Tsaubwas.

King. If this is true, call the lord of the east house (eldest son), and let him appear forthwith!

[*Music.*

SCENE 2nd.—

Noble. Oh my lord, &c. &c. &c. &c.

Prince. Say, what thou hast to say.

Noble. The royal sire has sent to command your presence.

Prince. If I am called, I will but take a glance into the mirrors and adjust my turban, and come with you at once into the audience chamber.

SCENE 3rd.—*The Hall of Audience. Prince, nobles.*

Prince. My lords, tell me, who am the royal son, whose glory is like the sun of day, who enlightens the four islands; whose renown is universally spread; whether the imperial father—the embryo deity whose white umbrella is unfurled—has yet entered the palace of audience;—tell me, too, if the royal mother, who reclineth upon the throne of lilies, has yet displayed her golden countenance, and is well?

SONG.

Wrought o'er with gems, and regal gold,
And glitt'ring flow'rs in ev'ry fold,
There stately canopies reveal,
To kings, who hither come to kneel,
The boundless riches of our land,
Whose rocks are rubies,—gold its sand.
In all the southern world beside,
There is not such a land of bliss;
Where'er the ocean rolls its tide,
It comes not to a shore like this;
Delicious odours fill the air,
And mirth and love reign every where.

[*The King enters.*

Prince. Oh, mighty father, this lion-hearted son, when he received the imperial order, placed it upon his head, and hastened to obey it.

King. My second self, my son Thoodanoo!

Prince. My lord.

King. The people of the whole country, the rebellious wretches, are up like flames of fire—go, and exterminate them.

Prince. (I have heard that) Setang, Siam, and Cochin-China, not fearing the golden sword, are in open rebellion. It is nothing. They seek a quarrel, and the golden son will root up the whole race, without making use of the weapons of war;—he will but publish forth the king's glorious title, and they are gone.

King. Good, my son; go forth and repay to me the favours I have bestowed upon you. Let Cochin-China be your first point of assault, and return not till you come as a conqueror.

Prince. I will reverently obey the royal command, and make the golden cause conspicuous.

SCENE 4th.—*The Prince's palace.*

Prince to Mananhurree. Delicate creature; silver palace-born beauty; whose charms are so surpassingly wonderful; I must go with the army which marches with to-morrow's dawn.

Manan. Oh, my lord, why will you thus desert me? You are my only protector here, at once my father, and my husband. If indeed you have resolved to abandon me, I must bear the fate that awaits me.

Prince. It must not be so, pride of my soul. I must not neglect the duty which a child owes its parent: moreover, consider, I beseech you, that I am nearest the throne, and must yield to the custom of my country, and lead the army against the rebels.

Manan. Alas! If you possess so little affection for me, as to leave me here alone, I must submit to my evil destiny.

Prince. [*To his Noble.*] Hear you not my lord? She does not say, stay; nor does she desire me to go!—she weeps!—her tears and smiles are so fascinating, that I shall be vanquished; her tears are like sparkling drops of dew upon the leaf of the lily; whenever I look upon them, I have not resolution enough to go.

Noble. Let me explain to your highness. The princess is here without friends; if you desert her, she will be as much alone as the *kynneya* without its mate; she will be confounded with her lot, and will be no more than a waxen image. There is indeed no necessity for your departure, and leaving her here in tears.

Prince. Alas! If I avoid this campaign, I shall have my name held up to the scorn and contempt of posterity. The king, my father, will be enraged against me if I do not accompany the army. Oh, I must indeed depart. Then this friendless one! when left alone, will break her heart, and I shall be left destitute. I am in a painful dilemma, (like a bamboo between two boards)! I may as well swallow poison, or throw myself into a furnace. If I petition the king to allow me to remain at home, he will order me to do so; but after what I have already promised it will be improper to ask!—then she will not die!—she will only waste away. I *will* join the army;—caparison my elephant Mengala, and bring him to the palace, and the lord of the golden universe will depart.

SCENE 5th.—*The Prince's Palace. Princess, attendants.*

Manan. Mala, Maensa! my faithful maidens come hither; for the time of my pregnancy is completed.

Maensa. [*To the Treasurer.*] Here is our royal mistress at the time.

* * * * * * * * * * *

[*The child is born.*

Treas. I must hasten to the camp, and communicate the tidings to the royal ear.

ACT.

Camp.

Treas. Oh, my lord! the empress sovereign of the state!

Prince. Speak, my lord.

Trea. I am come to communicate to the golden ear, that the rincess Manan has been delivered of a son.

Prince. Then I will forthwith return, and look upon my little n.

ACT.

Scene 1st.—*The Prince's palace.*

Prince. Gem of my heart, tell me! tell me, if you are well!

Manan. I am well, my lord.

Prince. [*To his lord in waiting.*] Make known to all the army, at the little prince has received the name of Moung Shory Gyew. *To the princess.*] Pure leaf of silver, captivating creature, picture of ftness and beauty, mother of our babe—stay but for a brief space ith your companions, my concubines, in the palace, and I will again e with you in three months.

Manan. Pray do not be concerned about me, my lord, I will ay here; commence your journey, and be true to me.

Prince. You say well, my rose tree, but it is not my own wish depart; I must obediently perform my sire's command; of course must not avoid my duty.

Scene 2nd.—*The Prince's palace. Princess, attendants.*

Manan. Oh, my maids; the little prince is now seven days old, t us place him in the emerald cradle and rock him (to sleep.)

SONG.

Gently let us rock the swing,
And hush to sleep the baby king:
Palace maidens—softly sing,
(*Chorus*) And lull to sleep the baby king.

2

Coolly let the palace rose
In his jewell'd couch repose:—
Persuasive voices, hither bring,
(*Chorus*) And lull to sleep the baby king.

Scene 3rd.—*Palace of Audience.*

King. Oh, wise ministers, who continually wait in my presence ke the seven mountains which surround the lake Nandat!—I have reamt that the country of Pyentsa was surrounded by my intestines, nd that the sun and moon descended from the firmament and fell to my lap. Explain quickly what this means.

Noble. Oh, king of the golden palace, whose glory is great, the rahmin Naythoda, whose place is near the throne, will be able to un- erstand the dream.

King. Call hither the Brahmin Naythoda. [*Naythoda and his disciple enter*] Oh, learned teacher, I have dreamed that my bowels surrounded the country of Pyentsa, and that the sun and the moon fell at my feet. Show me the interpretation of this thing.

Naythoda. It is well, Oh benefactor!—let me but consult my astrological tables; [*he consults his scheme,*] one from one—nothing; nine from one—nothing; two and five.—I have made the calculation—[*the Pawn tumbles in the water,*] Oh! are there nine, or one? [*To his scholar,*] The benefactor dreams propitiously, but I will divine unfavourably. [*To the King,*] The benefactor, the lord of life and property, must sacrifice to the Yeet spirit one hundred fowls, and one hundred hogs, and it will be appeased.

King. Is this all, Oh teacher?

Nay. Lord of the earth, I am afraid to—

King. Say on, learned teacher, without regard to any one; only let myself and the chief queen be exempt.

Nay. Oh! benefactor, cut the throat of that celestial spirit who is like the *kynneya,* and offer up her blood before the Yeet Nat. [*To his disciple,*] Close the doors of the prince's palace on all sides, for so is the king's command.

SCENE 4th.—*The Prince's palace. Princess, attendants.*

Manan. Oh, my faithful women, Mala! Maensa! go and take your rest. My doors are closed, and my blood is to be poured out before the Yeet spirit——must it indeed be so? Oh, my absent lord, our son Moung Shory Gyew is yet an infant.

SONG.

[*Enter the Prince's Mother*

Queen. Oh, daughter of the pleasing countenance! here is your enchanted zone;—take it, and escape to the city of the silver mountain.

Manan. Thanks, royal madam; thrice I salute you reverently.

SONG.

ACT.

SCENE 1st.—*At the hermitage of a recluse who lives on the boundary which divides the earth from the country of the silver mountain. Princess. Recluse.*

Manan. Holy hermit, should the Prince of Pyentsa come hither deliver, I pray you, this ring and these drugs into his hand.

ACT.

SCENE 1st.—*The Prince's camp.*

Prince. By the strength of this arm have I made my father's glory reat. Cause my elephant Yauoung to be caparisoned, for the princess)waynow's lord will return to the city of Pyentsa.

Noble. My lord !

Prince. Let the golden spearsmen, swordsmen, and the golden hield-bearers and armour-bearers be set in order, and the four rand divisions of the imperial army.

Noble. They are so, my lord.

Prince. Good general, the princess Manan, who keeps her court n the north palace, will bend her head in watching for my return like he golden lily shaken by the wind—she will droop with fatigue, let is therefore make long marches.

SCENE 2nd.—*Camp near Pyentsa. The army returning.*

Prince. Oh, my lord, I cannot sleep;—when the army reaches he garden near the city, let the artillery discharge a salute.

SCENE 3rd.—*The Prince's palace. Matrons, waiting women.*

1*st Lady.* Our royal mistress upon hearing of the plot against ier life, fled to the city of the silver mountain—we shall all without xception undergo the royal punishment.—Hear you not the voice of he great guns? Let us go forth and meet the returning army.

Camp.

Prince. Oh, sweet ladies Mala, Maensa ! the princess Manan, where s she? The charming mother of our infant son—where is she gone?

Matron. I will explain, my lord, about the princess, to whom I gave the same care, as to this hair I daily dress—she who was the celestial spirit of the palace, oh king of the city of the sun.

The royal father having had a dream sent for the astrologer, who cherishing resentment and malice towards your highness, purposed to offer up the mother of Shory Gyew as a sacrifice to the Yeet Nat, upon hearing of which she forsook the palace and returned to her own country.

Prince. Ah ! The love that is felt for the father should be extended to the child. I was absent; would that I had been present ! My little son Moung Shory Gyew has not even quitted his mother's breast !—I have had no regard paid to me in my absence—Manan and myself are one. I am the head of this royal line, my son Shory Gyew

is the king's grandson, and my queen was his daughter-in-law. —— Let me brood over all this!———I swear, by the sacred books, tha I will remain here no longer. Oh, attendants! every one of ye! l none be absent!————the lord of the mundane circle will jou ney towards the silver mountain,—let the huntsman be called in the presence.

Noble. Thy servant, the huntsman, has been called, and is no here.

Prince. Oh! quickly show the golden prince, who rules th universe, the land they call the silver mount, whence came the moth of my son; and quickly show the rural lake, in which thou did' thy captive take.

Hunts. The country of the silver mount! I know not where it i my lord.

Prince. Then quickly bring me to the delicious pool in whic thou foundest the mother of Shory Gyew—the prince has never y been there. Oh huntsman rise, without delay, and bring the prin upon the way.

Hunts. My lord, I will begone.

ACT.

They enter the Haywonta Forest.

SONG.

These plashing colours surely come,
Reflected from the upper sky,
Where Tawadyn's celestial dome,
Is hidden from the mortal eye.

Prince. Look, my lords, at the delightful bath of the mother o Moung Gyew! how beautiful the flower trees that grow upon it banks, and what a delicious perfume they diffuse through the forest the woods are dense with leaves, which form a dusky shade in whic are sporting butterflies, beetles, and bees. Water-quail, kingfishers and pheasants nestle beneath the shadow of those golden lilies. Ho pleasant and exhilarating, my good huntsman.

Hunts. True, my lord, indeed most pleasant; I dare not ventur to number all the beautiful flowers that grow in the lake.

Prince. I see by your countenance, that if I demand their name you will be wearied in telling them.—You may now make your wa back to the city.

Prince. [*Alone*] Oh, my dear lost wife! take me with you, for I am in grief, or in a little time I shall be like one that is dead.——I must subdue my longing! Oh, divine beauty, dear to me as this life! Twice has her voice reached my ear, crying, husband, husband!—Oh let my fate like Ramas be, who lost and found his lovely bride; let Manan be restored to me!

SONG.

This spot must surely be like the region through which flow the seven celestial rivers;—dragons, galongs, and spirits must here abound, as well as devotees and hermits. Spices of all descriptions grow here—the trees are wedged together—and the crowds of aerial spirits who frequent the thickets, pass each other with the uniformity of machinery, without confusion, like the traditions which have been handed down to us, from remote times, upon tables of stone.

[*Arrives at the hermitage.*

Prince. Oh, meek recluse, who findeth pleasure in practising the duties of religion—master of this holy dwelling—pray tell me if you are happy and in health.

Hermit. Whence does my lord come, who fearlessly enters this enclosure armed with a flying spear?

Prince. I will tell you, holy man. The golden ear listened to the misrepresentations of a foolish astrologer concerning the queen of the royal heir, the mother of Moung Gyew, who is a lesser spirit; and as she was near losing her life, she abandoned her little son, and quitted the city of Pyentsa, which is the cause of my coming here armed with bow, spear, and sword.

Hermit. Hist, Hist! Do not follow her; do you think the road is easily traversed? the way is most frightful. Oh what a savage road it is, rocks, hills, and precipices; the air is stagnant; thorns and briers lie scattered in the path, and vast creepers entwine themselves (among the trees); and beasts of prey abound every where. Oh! do not go, my lord, for this is not all; what numbers of enemies you will meet with!—beyond the (dense jungle) about twelve miles, there are speckled monsters which lie (in wait) across the road to devour you; oh, do not go. Besides these there are other obstacles, there is a stream of copper, which burns to atoms; beyond this about twelve miles there is a frightful devil which will instantly devour you, for there will be no one to help you; if my habitation were near, the

monster would respect my presence—Oh, my lord, each step of the road is a great grandfather to the last passed over; do not go.

Prince. If I do not meet with Maydow of the silver mountain, though nine or ten worlds may have passed by, yet I shall not think of returning.

Hermit. My lord, as sure as that the castanets direct the measure of the song, so surely is your highness leaping into the mouth of the tiger.

Prince. If I do not meet with Maydow of the silver mountain, I would not think of returning, though hell itself were before me.

Hermit. There are other Dwaynanhas in the south island besides the one of the silver mountain, cannot you search for one here? Give me the magic bow which your highness carries, that good may come of the gift, and then depart on your journey back.

Prince. If your holiness requires the bow, take it.

Hermit. Astonishing! surprising! wonderful! To look at it, it is but an insignificant thing; but how heavy it is, and what strength it has!—I detained him because I thought he was one of the common order, but I now find he possesses many powers; so many indeed, that he may travel in safety wheresoever he chooses, either on the air or under the earth. Let me see if I can find the ring and the drugs which the benefactress Manan entrusted to me—I will go and look for them!——Ah! here they are—I bestow them upon your highness.

Prince. If your reverence's hair was more than three cubits in length, my obeisance would be still longer.

SONG.

[*The Prince arrives at the haunt of the devil.*

Prince. I will just sit down here, and take some betel leaf to refresh me.

Devil. My tribe have reigned in this Haywonta forest from the beginning—here have we held uninterrupted dominion, killed whatever we found, and eat it without cooking—our power, I fear, is about to be overturned. [*Sees the Prince,*] Oh, what is this? a mortal or a spirit? Didst thou arrive here by the road? You are my victim.

Prince. Listen! and I will tell you. I am neither a dragon nor a spirit, Pyentsa is my country; Thoodanoo my name; will you indeed eat me!—look at my sword, foolish devil!

Devil. Tush ! Tush ! Your sword is only a hand's breadth—you are unarmed—you are like the flimsy paper which is tough in the sunshine, but which falls to pieces in the rain.

Prince. Listen, devil ! Your pride is excessive ; if you do not retreat, you will be slain.

Devil. Attend, prince ! Whoever enters this forest of Haywonta, must acknowledge my power, and become my prey. [*Music.*

Devil. Oh, prince, make me your slave.

Prince. Forest king, are we not near the cane barrier and the copper stream ? conduct me past them.

SONG.

[*The devil conducts the prince.*

Devil. Oh, good prince, if anything happens to you, remember to call upon me for aid, I will now return to my post.

SONG.

Prince. The silver mountain towards which my face is now turned, is still distant ; my good genius is forsaking me, and my bad fate is leaving me a prisoner in this wilderness of dangers.

SONG.

The Prince arrives at a gigantic thorn tree, upon which are sitting two monstrous birds, with faces like mortals.

Female bird [*to her mate.*] We have satisfied our hunger to-day upon the flesh of lions, elephants, and deer ; what I wonder shall we find to-morrow ?

Male bird. Beautiful is thy speckled plumage ; to-morrow the princess of the silver mount will bathe and anoint her head. I smell the food preparing for the feast ; there will be more than I can devour—I will keep some in my pouch for you.

Prince. Oh, powerful birds which roost upon this immense thorn tree !—

Male Bird. Since I first alighted upon this tree, I have never heard the human voice. What art thou ?

Prince. Oh, mighty bird, listen, and I will tell—assist me to reach the silver mountain, and I will repay your favour.

Bird. Be not concerned, for I will give you the help you ask, young prince ;—neither horse nor elephant assisted you to make the

journey thus far—only your own perseverance; my mate is sick, but I will take you upon my back.

[*The Bird carries the Prince.*

Prince. Oh Bounmadee! thou mighty bird, alight under the shadow of these banyan trees, and leave me alone.

ACT.

SCENE 1st.—*City of the Silver Mountain.*

King. Millions of nobles, wearers of the golden chains of nobility, who follow behind me—my daughter Devay Manan having returned from the country of mortals, will bathe and anoint herself; appoint therefore 500 beautiful maids with budding breasts, to take each nine golden goblets, and go in procession to the east side of the city, to draw water for the ceremony.

Noble. My lord, we attend. Let Maensa be appointed directress of the procession. [*To Maensa*]. Go forth to the lake without the walls to the east of the city, and draw water for the approaching ceremony.

SCENE 2nd.—*Procession of Women.*

SONG.

Maensa. Ladies, under the shade of those banyan trees before us I see a young (Nat) spirit sitting, if he calls answer him not; she that transgresses shall pay a fine of five tecals.

Prince. Lovely palace damsels, if you have with you a little betel leaf, I entreat you to give me some.

One of the ladies. Do not be concerned, my lord, for betel leaf; if you desire it, I will give myself to you.

Prince. Oh deities, angels, and spirits! let this ring which I drop into the water reach the hand of my beautiful Manan!

[*He assists a maid to place the vessel of water upon her head and drops the ring into it.*]

SCENE 3rd.—*The Palace.*

Manan (while washing finds the ring.) Ladies, tell me if any thing happened at the lake, when the procession went out to draw water.

Maensa. Under the shade of the banyan trees which grow there we found a young spirit resting himself, and he assisted one of the maids to place the water vessel upon her head.

Manan. Oh my husband, come and take me!

The news of the young prince's arrival being communicated to the king, he is very angry that a mortal should presume to enter his country and lay claim to his daughter; he therefore orders that he be made to ride upon some wild horses and elephants, and the young prince acquitting himself surprisingly well in training them, the king promises to give him his daughter, if he can shoot an arrow from one of the bows of the palace. The prince shoots an arrow with ease and dexterity; but the king insists upon another trial—he obliges the prince to select the little finger of Manan from amongst those of her sisters, which are thrust to him through a screen; this also the prince does, by the assistance of the King of Nats.

Art. II.—*On the Bora Chung, or Ground Fish of Bootan.*

To the Secretaries to the Asiatic Society.

Gentlemen,—The following account of the *Bora Chung* or as it may be called, the Ground-Fish of Bootan, is so extraordinary, as to be worthy I think of the attention of the Asiatic Society, for so far as I know it is new. I am indebted for it to Mr. Russell, of Rungpore.

The Bora Chung is a thick cylindrical fish, with a body somewhat like a pike but thicker, with a snub nose, and grows from three pounds weight, to a length of two feet. The colour is olive green, with orange stripes; and the head speckled with crimson spots. It is eaten by the natives of Bootan, and said to be delicious.

The Bora Chung is found in Bootan, on the borders of the Chail Nuddee, which falls into the river Dhallah, a branch of which runs into the Teestah at Paharpore. It is not immediately on the brink of the water, however, that the fish is caught, but in perfectly dry places, in the middle of a grass jungle, sometimes as far as two miles from the river. The natives search this jungle till they find a hole, about four or five inches in diameter, and into it they insert a stick to guide their digging a well, which they do till they come to the water; a little cow-dung is then thrown into the water, when the fish rises to the surface. Mr. Russell has known them to be from six to nineteen feet deep in the earth.

Mr. Russell describes their other habits as not less curious. They are invariably found in pairs, two in each hole; never more nor less. He has not met with any less than three to four pounds; but as before said, they grow to the length of two feet. He has seen them go along the ground, with a serpentine motion, very fast, though the natives say they never voluntarily rise above the surface. In some

places they are very common, and live a long time when taken out of the water, by being sprinkled over occasionally with that fluid. One which Mr. Russell thinks to be the female, is always smaller, and not so bright in colour as the other.

I regret this account is so imperfect, especially as I have seen the fish, for when I was at Titalya, in March last, Mr. Russell very kindly sent me two of them. Unfortunately I was on the eve of starting with my family for the hills, and in the bustle of packing up, I had not time to examine them, intending on my arrival here to describe, and preserve the specimens for the Society. And still more unfortunately, I was unable to convey them up here, having been for want of carriage obliged to leave even many of the necessaries of life behind. Mr. Russell undertook to bring them with him; but one of them died and was thrown away in the plains, and the other made its escape from the vessel in which it was confined at Punkahbarry. He has promised to procure other specimens, so I hope soon to have the pleasure of sending some to the Society's Museum.

J. T. PEARSON.

DARJEELING, 10*th July*, 1839.

ART. III.—*Extracts from official records, with descriptive details regarding the new Nizamut Palace of Moorshedabad—erected by Colonel* D. M'LEOD, *Chief Engineer of Bengal.*

A superb model of the Moorshedabad Palace is now displayed in the apartments of the Asiatic Society, erected on a scale of half an inch to the foot; it forms an object of perhaps greater interest to the spectator than would the noble edifice it represents. In the model we have all the details of the structure at once exposed and intelligible. To the amateur architect, as indeed to the general visitor, the documents we now publish, will doubtless prove an instructive and valuable lesson in classical architecture. We should not omit to mention, that every part of the model is of native workmanship, and of the most perfectly beautiful execution.—EDS.

To the Military Board.

Political Dept.

GENTLEMEN,—I am directed by the Honorable the Deputy Governor of Bengal, to transmit for your information and guidance, the accompanying copy of a correspondence with the Committee appointed to report on the Nizamut buildings at Moorshedabad.

2. In making this communication, the Deputy Governor has desired me to observe, with respect to the further works contemplated, the most important are, a new Imambarra, in substitution for the old one, stated to be in a ruinous condition; the removal of Meer Munglee's house, and the building of a new one; and, lastly, a Mudrisso or College. The cost of the whole of these, and of furniture for the Palace, is estimated for 3,60,000, of which 1,50,000 has already been sanctioned for the Imambarra and for the Nawaub's house.

4. His Honor the Deputy Governor, further desires me to take this opportunity of observing, that much praise is due to Colonel D. M'Leod, who has designed and executed this noble edifice, which will long remain a monument of the ability of its architect.

I have, &c.

FORT WILLIAM, *(Signed)* H. T. PRINSEP,
9th January, 1839. *Sec. to the Govt. of Bengal.*

Extracts from the Report of the Special Committee of Inspection; dated 10th November, 1838.

We have the honor to submit, for the information of His Honor the Deputy Governor of Bengal, the result of our proceedings consequent upon the receipt of your letters of the 12th, 19th, ultimo, and without date, received at Moorshedabad, from the Governor General's Agent, in regard to the Nizamut buildings at Moorshedabad.

3. The new Palace is in length 425 feet, by 200 feet in breadth; and of one Order of architecture throughout the whole of its exterior, without any intermixture of the same on a reduced scale, or of any other Order. It stands on a slight elevation, produced by raising the foundation walls three feet above the general level of the ground, and filling up with earth to that height, in a gradual slope, to the extent permitted by the surrounding buildings, and the termination of the premises towards the river, on the banks of which the Palace stands—a conspicuous and imposing feature in the landscape from a great distance. The effect anticipated by raising the structure, as just described, has been fully accomplished.

4. The Order employed is the Grecian Doric. It is forty-six feet nine inches in height, having fluted columns thirty-six feet high; five feet six inches in diameter at the base, and four feet one and a half inches at the neck, with corresponding antæ, and an entablature of ten feet nine inches; the whole surmounting a basement of eighteen feet six inches, of which three feet six inches forms the plinth of the building. Over the entablature are parapet walls, varying in height according to circumstances, and ornamented with panels, plinths, and cornices. The pro-

jections of the cornice of the Order are of stone, having the guttæ and lilies in the angles cut out of the solid. Nothing could be more satisfactory than the execution of the whole detail of what this involves. The Doric Order is notoriously of difficult management, when applied to edifices of complicated design, from the necessity of observing the rules prescribed for the introduction of the triglyphs in the frieze of the entablature. In the present instance, with many projections and recesses, tending to create difficulties, there was not discoverable the slightest deviation from what these rules demand; the cornices and mouldings were noticed as being cleanly and sharply cut and defined and all lines and surfaces, whether of stone or plaster, exhibited the most successful result of much labour and minute attention.

5. On the south front is a portico of eight columns, ninety-seven feet nine inches in length, surmounted by a pediment twelve feet high and having a strong trussed roof of timber secured transversely by iron tie-rods. To the north, is the entrance portico of six columns measuring seventy feet nine inches in length, with a corresponding trussed roof to the pediment, which rises ten feet; in the tympanum of either pediment are the arms of the Nuwaib Nazim, perfectly executed in relievo, and forming a very appropriate and effective finish to the whole.

6. Leading to the northern portico, is a noble flight of stone steps commencing in its breadth above from the centre of the end columns and having a platform stretching out in the same parallel to a width of twenty-four feet nine inches, from which, descending, it curves outwards on either side till it ends at its base, in a line extending to the length of 129 feet. There are two intermediate platforms, one of ten and one of five feet in width; in a line with which last, at the extremities, are well proportioned pedestals with stone slabs, bearing inscriptions (the letters cleanly cut in relief) in English and Persian, exhibiting particulars connected with the erection of the edifice, (see enclosure No. 1,) and in front of these pedestals, on blocks carried out from their bases, corresponding in height and breadth with the last flight of steps, and ten feet six inches in length, are placed two sphinxes, admirably executed, both as regards the design and workmanship. They are of solid teak, but painted and sanded so as exactly to resemble stone, and form highly ornamental appendages to the entrance in the position they occupy. Iron railing, of a graceful pattern, corresponding with that of the colonnades (rising from which are five lamp-posts on either side, with three on either pedestal below) surmounts the flight at either extremity. Underneath, is a capacious carriage way; and there are three vaulted ranges, two of them open

nd one (the lowest) closed in, and forming *ábdarkhánesh* and other useful offices.

7. To the north front are two smaller porticoes (to the wings) of our columns each, and intermediately between the centre and wings on either front, receding colonnades; which also form leading features of the end fronts of the building.

8. To all the above colonnades, including the porticoes, are continuous balconies to the third floor, four and a half feet wide, of light appearance but of great strength, being constructed of iron beams or cantilevers from nineteen to twenty-one inches apart, inserted in the walls between stones to a depth of one and a half foot, and supported on brackets at intervals, the rest of the material of the floor being of flat bar iron. The floor is composed of tiles, terras, and marble, confined by a plate or band of iron. The railing is partly of iron and partly of teak; the main supports and some of the rails being of the former, upheld by brackets branching from the cantilevers.

9. The spaces over the doors and windows within the colonnades, as well as those of the treble windows in the exterior walls, are relieved by panels, in which are inserted ornaments of various descriptions, in relief of good design, and extremely well executed.

10. There are two open courts in the interior of the building, seventy-two by fifty-two feet, finished in every respect in the same style as the exterior, having substantial drains all round, communicating with large covered ones externally, which are carried to a considerable distance, and empty themselves into the river.

11. Round the exterior of the building there is a platform of the finest masonry, bricken-edge, seven feet wide, from which spring small flights of stone steps to the height of the plinth, leading to the entrances in the several compartments of the edifice; outside of which is a roadway or walk, of corresponding breadth, composed of *koah* nine inches in depth. The plinth of the building has oval flue openings of twenty-two by eighteen inches, furnished with strong iron gratings;—where flights of steps interfere, three of the step-facings on each have gratings, of eighteen inches in length, fixed into them.

12. The interior comprises a basement floor, from thirteen feet to thirteen feet three inches in height to the beams; a principal floor, from twenty-one feet nine inches to twenty-two feet in height, to the ceilings; and a third floor of the same height as the latter.

13. The principal entrance is from the north portico into a vestibule thirty-six feet by twenty-seven feet, having a geometrical stone staircase at either side, seven feet six in width, with iron railing and

mahogany hand-rail, each staircase receiving light from four painted glazed windows.

14. Within this range is a corridor or passage, twelve feet wide; leading to the wings of the edifice, divided into compartments, and so contrived, that by shutting two doors the communication with the wings is cut off, without any interruption to that between the other portions of the building.

15. From the centre of the corridor a large door opens into a circular room fifty feet in diameter; to the right and left of which (on entering) is a room fifty-two feet by twenty-five feet; the three comprising one suite of apartments, separated from the wings by the open courts, (noticed in paragraph 10.) The circular room is of the Corinthian Order, taken from the temple of Jupiter Stator at Rome. The Order is in height thirty feet six inches, with pedestals of four feet six inches. From the entablature, on a line with the frieze, springs a cupola of masonry, with sunk panels, ending in a painted glazed skylight twenty feet in diameter, the height from the floor to the opening of the skylight being fifty-six feet, and to its apex sixty-two feet. The room is decorated in its circumference by four large covered recesses, over which are long panels, eight pilasters, and four large doors; over which last are oval openings occupied with pierced screens of arabesque, cut in single slabs of stone. All the mouldings and compartments are richly carved and ornamented, in conformity with the rules of the Order of which the apartment is composed; and, whether as regards the effect of the whole, or the exquisite finish of the details throughout, it is impossible to speak too highly of what has been accomplished. There is nothing to add and nothing to alter: the architect and builder have done their work perfectly.

16. To the south of the above suite, is a grand colonnaded saloon, measuring one hundred and eighty-seven feet six inches in length, susceptible of division at pleasure into three apartments, by means of sliding doors, eighteen feet two inches wide, the leaves sliding into cases, faced on both sides, from the bottom to the top, with mirrors. The general width of this saloon is fifty-five feet, the centre space within the bases of the columns being twenty-five feet. Beyond either extremity of the saloon is a geometrical stone staircase, five feet three inches wide, with railing, as before described, communicating with the apartments of the wings.

17. The wings do not correspond internally with each other: both are divided into apartments of various suitable dimensions, each having a spiral stone staircase at either corner, with baths, dressing rooms, &c.

18. With exception to the circular room (of paragraph 15) the interior the whole of the principal floor is of the Roman Doric Order.

19. On the third floor the dimensions of the several apartments cessarily correspond with those immediately below, just described, cluding the circular room, which comprehends both floors. In this ird floor also is the same arrangement of the saloon as that described r the principal floor, but the Order throughout is the Antique Ionic, neteen feet high with fluted columns, pilasters, &c. surmounted by a ved ceiling rising two feet nine inches.

20. The whole of the apartments in both these floors are ceiled ith canvas, or teak wood frames, through which are fitted into the ams strong brass hinge-hooks for punkahs, and brass for lamps or istres, to an extent ample for every purpose of use or ornament.

21. In both floors the doors are painted in imitation of different oods (Satin wood, Mahogany, Oak, Maple, &c.) and highly varnished ; nd, with a few exceptions (in the minor apartments of the wings) ey are fitted with plated locks, bolts, and hinges, and hand-guards ; lso on the principal floor.

22. All the apartments in the wings of both floors are coloured n distemper, in light tints of various colours ; and the walls, as high s the surbase of the vestibule, and four staircases are painted in mitation of marble ; all with very good effect. There are twelve fire-laces, with carved mantel pieces of teak, also painted and varnished n successful imitation of rare marbles.

23. The floors of the whole of the public apartments of the princi-al story, including the vestibule and landing places of the great stair-ases, are paved with polished marble ; and those of the corresponding partments in the third story, with the landing places of all the four taircases, are laid with teak boarding.

24. The whole of the public rooms in both floors, and the columns n the wings, are finished with polished stucco, in imitation of the Madras chunam ; and it may here be observed, that the flutings and nishings of all the columns, exterior and interior, are remarkably ell defined, and evenly and sharply wrought ; a completion very rare, where brick and plaster are the materials, in houses even of the high-st pretensions in this country.

25. The basement floor is finished in a plain style, having a simple oulded band under the beams and no ceilings. The doors and indows are of appropriate substantial construction, fitted with brass cks, bolts, and hinges, and painted plainly. Under the circular oom (of paragraph 15) are four strong lock-up closets for treasure, plate, ewels, or other articles of value, with a large open space for a guard.

In the arches of the treble windows of this floor, fifteen in number, ar coloured fan-lights.

26. In the west wing is a steam-bath, complete in all respects, exe cuted subsequently to the erection of the building, as we were in formed by Colonel M'Leod, at the particular desire of the Nuwai Nazim.

27. All the exterior colonnades and porticoes in the basement an principal floor, as well as the vestibule and staircases of the basemen are paved with stone.

28. Koah roads, twenty feet wide, have been constructed, and we rolled, in all that portion of the ground about the Palace which ha yet been cleared of old buildings: the banks of the river have bee sloped off and sodded throughout the whole extent (with the exceptio to a very small portion, for which it seems earth was not procurable and stone posts have been inserted along the top, as fastenings fo boats. The whole of the ground (cleared) has been smoothed an grassed, and completely drained.

29. At a short distance, in front of the Palace, is a handsome sun dial, five feet in diameter, a surplus stone so converted by Lieu Cunningham; it rests on a pillar based on stone steps, and forms useful and appropriate appendage to the premises.

30. A substantial stone ghat, fifteen feet wide, has been constructe near the Palace for the convenience of the Nuwaib, and at about 80 yards to the south of the Palace a large *Noubulkahneh* gateway ha been erected, as an entrance to the grounds in that direction. As was not immediately in view, there did not appear to be any ob jection to its being built in a style of architecture adapted to its pu pose, and the Asiatic or Turkish has been adopted.

32. In concluding this head of our report, it seems proper to adve to the fact of this edifice, in all its departments, having been con structed and completed by natives of the country; the only excep tions to which remark are in regard to the painting and glazing, whic portions of the work were executed by professional Europeans. Th expressions of approval which will have been found interspersed wit the preceding details, were elicited by particular features of the build ing under review, inviting a more peculiar attention from their impor tance, or the effect produced by them on the eye of the observer; bu they are equally applicable to every part of the structure, which whe ther considered as a work of art to be admired for its exceeding beauty or as an example of skilful labor applied to the practical combination excellent materials, reflects the highest credit on the architect and a

ubordinate to him, concerned in its erection. The late rainy season vas one of uncommon violence, and had just closed when our survey vas made, and the soil far and wide was either inundated or aturated with moisture. Nothing could have more searchingly tested he strength and solidity of a newly erected edifice ; but not a crack r symptom of yielding was to be seen, externally or within, through- ut the whole extent of this fabric ; and we conclude our remarks pon it with the expression of a grateful anticipation, that a lengthen- d durability awaits what we have represented as so pre-eminently vorthy of a lasting preservation.

In conclusion, we would here recapitulate, in a few words, the pinion to which our inquiries have led regarding the three points to vhich reference is made in the second paragraph of our report.

As to the execution of the works, our verdict after a careful exa- ination of all that presented itself to our view, is one of unqualified pproval and commendation.

A plan of the premises with which the architect has kindly fur- ished the Committee, is appended ; and will render intelligible at glance the relative sites of the different buildings forming the subject f this report.

We have, &c.

(*Signed*) R. H. RATTRAY,
,, W. CRACROFT,
,, HENRY DEBUDE,
,, W. R. FITZGERALD.

CALCUTTA,
10*th Nov.*, 1838.

ART. IV.—*Researches on the Gale and Hurricane in the Bay of Bengal on the 3rd, 4th, and 5th of June, 1839 ; being a first Memoir with reference to the Theory of the Law of Storms in India.* *By* HENRY PIDDINGTON.

PART I.

The notices of Colonel Reid's Book on the Law of Storms, which ppeared in the Calcutta papers and Edinburgh Review, had much xcited my attention ; for the subject was, to me, one connected with ıany associations of early life, and more especially with one instance ı which to the veering of a hurricane alone I owed my safety from ıipwreck, after cutting away the mainmast of a vessel which I com- ıanded.

Hence, having some leisure when the tempest of the 2nd to the 6th f June, 1839, occurred off the Sand Heads, I was induced to under- ke the investigation of its different phænomena, with a view to see ow far they would accord with the theory of the Law of Storms.

The sources from which I had to obtain my information were the logs of fourteen vessels which arrived at Calcutta, having felt the effects of the gale or of the hurricane; the reports of the Pilot and Light vessels, kindly furnished to me, with the permission of Captain Harrington, by my worthy friend Captain Clapperton of the Bankshall; and accounts obtained from Balasore, Poree (Juggernaut), Masulipatam, and other places, in all about thirty different authorities.

These sources form the amount of what was available here; but, that the inquiry might be as complete as possible, I addressed the following letter to the President of the Calcutta Chamber of Commerce.

To R. H. Cockerell, Esq.

President of the Calcutta Chamber of Commerce.

'Sir,—I beg to state that I have undertaken the investigation of the course and effects of the gale of the 3rd, 4th, and 5th instant, with reference to the theory of Colonel Reid on the Law of Storms.

'I have applied, personally or by letter, to most of the captains or consignees of the inward-bound vessels which were exposed to it; and with the permission of Captain Harrington, and kind assistance of Captain Clapperton, shall obtain from the Bankshall reports from the H. C. Pilot and Light vessels. My chart is already drawn, and I am only waiting for the logs and reports.

'So far, I trust, we shall be able to embody all the information which can be obtained here, and perhaps furnish a valuable supplement to Col. Reid's book; but it is evident that our work will not be complete without the statements to be obtained from the logs of the homeward bound ships from hence; which, having stood to the south-eastward on leaving their pilots, were more towards the middle of the Bay than the inward-bound ones, whose track is toward Point Palmiras.

'It is therefore my intention to print the information obtained here with a lithographed chart, and to forward it to the President of the East India and China Association, by whom it will be forwarded to Col. Reid if in London, or if absent to Mr. Babbage; to whom I am, by the kind assistance of Sir Edward Ryan, allowed to refer; and who will take up the completion of the investigation, or refer it to competent hands.

'But it has occurred to me that less attention might be paid to the application of an individual than to that of a public body; and therefore take the liberty of addressing you, Sir, as President of the Chamber of Commerce, to request that it will be pleased to direct its Secretary to write to the Chambers of Bristol and Liverpool, the East India and China Association, and the owners and commanders of the vessels in the accompanying list, praying from them the

sertions in collecting and transmitting the required information to ne President of the East India and China Association. I add a draft a letter which states what are the points on which it is desired.

'It is unnecessary for me to add that, to a naval and a commercial ation, the value and importance of a correct knowledge of the laws y which storms are governed is such, that, in the words of Sir John Herschell 'it cannot be overrated;' and this I doubt not will excuse ny intruding upon you and the Chamber for your kind assistance.

'I am Sir,

'Your obedient servant,

'H. PIDDINGTON.'

CALCUTTA,
June 25th, 1839.

List of Homeward-bound vessels from Calcutta, the logs of which it is desirable to obtain for the investigation at home.

Vessels' Names.	*Commanding.*	*Left the Pilot.*
Ship Marian, ...	T. Henry, ..	22nd May, 1839.
Barque Cape Packet, ..	C. Lamb. ..	22nd ,,
F. Ship Emma, ...	J. A. Bonamour,	
Barque Bengal, ...	J. Marjoram, ..	23rd ,,
Ship Mobile, ...	D. Ogilvy, ..	23rd ,,
Barque Lloyds, ...	E. Garrett, ..	24th ,,
Barque Renown, ...	D. M'Lean, ..	24th ,,
Ship Gloucester, ..	S. E. Crook, ..	24th ,,
Barque Gentoo, ...	H. Dodds, ..	26th ,,
Ship William Nicol, ..	J. Potter, ...	26th ,,
Barque Augustus, ..	A. J. Gordon, ..	27th ,,
Barque Elizabeth, ..	J. Deivar, ..	29th ,,
Barque Clydesdale, ..	C. Davis, ...	29th ,,
F. Barque Appollon, ..	Langlois, ..	31st ,,
Brig City of Aberdeen,	J. Monro, ..	31st ,,
Ship Frances, ...	J. J. Johnson, ..	2nd June, 1839.

DRAFT OF A LETTER TO COMMANDERS AND OWNERS.

SIR,—I am directed by the Chamber of Calcutta to state that Mr. Piddington, of this city, has undertaken the investigation of the course and effects of the gale experienced in the Bay of Bengal between the 2nd and 6th June, 1839, with reference to Colonel Reid's theory of the Law of Storms. The immense importance of this subject to commerce and navigation it is not necessary to point out. All the information collected here will be printed and sent home with a litho-

graphed chart, but it is evident that the inquiry can only be com plcted by having the tracks and weather experienced by the ship homeward-bound from hence also laid down upon the chart; and have therefore to request that as of the ship you will b pleased to forward, free of expense, the information requested below t A. H. De Larpent, Esq., President of the East India and China Asso ciation, by whom it will be placed in the hands of Colonel Reid, or, i his absence of Mr. Babbage, to complete the investigation begun here

The information desired, is—

1. Copy of the ship's log from the Pilot to 15° north latitude, witl any information obtainable from the journals of the captain, officers or passengers.

2. Notes of the heights of Barometer, Thermometer, and Simpie someter; these are very desirable.

3. Peculiar appearance and states of the weather as to clearness heavy dark clouds, &c., as noted at the time, or from recollection.

4. Electrical or other phænomena, as remarkable lightning, water spouts, &c. and generally the most detailed information which can b afforded, particularly from the 2nd to the 6th June, 1839. The mor details the better.

Your's, &c.,

———.

Secy. Calcutta Chamber of Commerce

To H. PIDDINGTON, ESQ.

SIR,—I am directed by the Chamber of Commerce to acknowledg the receipt of your letter of 27th ultimo, explaining how you are en gaged in tracing the course and effects of the late gale in the Bay c Bengal, to ascertain how far the phænomena observed will support th theory recently promulgated as to the Law of Storms. And I have t inform you, that the Chamber will be happy to address the East Indi and China Association of London, and the Chambers of Commerce o Liverpool and Bristol, to obtain the particulars required from th homeward ships to complete the interesting investigation which yo have undertaken.

I am, Sir,
Your most obedient servant,
W. LIMOND, *Secretary*

BENGAL CHAMBER OF COMMERCE,
July 1st, 1839.

There was no other nautical source from which information could be obtained. I made a public request, in the newspapers, for the heights of barometers at noon from the captains who had obliged me with their logs, so as to compare these with the register kept at the Surveyor General's Office, and obtain thereby, as nearly as possible, the correct barometrical state of the atmosphere during the gale; for it was evident that, if one barometer had an error above, and another below the truth, their difference would appear much greater than it really was. In only one or two instances was this request attended to.

As stated above, I found on the part of every public officer, as well as on that of the merchants and agents whom I addressed, the greatest readiness to assist me, and this was also the case with the majority of the captains of ships; some of whom seemed to take a pleasure in affording all the information they could furnish, accompanying their logs with detailed notes; but a few were sadly churlish, and had to be written to or called upon three or four times, before they could be persuaded to take the trouble of furnishing me with the extract of the four or five days' logs, which was all that was required;* and others, still more provokingly, having given me a valuable extract, paid no attention to my repeated applications for further information on points which would evidently have been of the greatest interest. I abstain from mentioning names. But in one instance I called and wrote *seven* different times, to obtain further notes, or a sight of the ship's log book, and without success! The subject was new to some, and they were not aware of its importance. "I don't think they will make much of it" was the remark of more than one; until what *had* been "made" of it was explained to them. Unfortunately indisposition prevented me latterly from going on board of the few vessels which have thus escaped me. There is, it is true, some excuse for men so hurried and vexed as commanders of ships, having to discharge and re-load in Calcutta, often are; but I trust on a future occasion that, as I shall elsewhere suggest, authority will be given to the Master Attendant to compel the fulfilment of this public duty; so exceedingly trifling in itself from each individual, and yet so deeply important to the community at large, and indeed to the very individuals from whom it is required, did they rightly understand their own interests.

It will be necessary first to place upon record the materials, before proceeding to the deductions they afford; but to do this within a more

* The answer to my second or third chit in one instance is worth inserting.

"Mr. Piddington, *Calcutta.*

"Sir,—I received your note, but I have not time to attend to such trifles. But if you call on board the ship, in all probability the Mate will allow you to see it." ——

convenient compass, and to the landsman in a more readable shape, I have, when the captains of vessels themselves have not given me a summary, made one from the logs, comprising all that is essential to our purpose. The seaman will, I hope, be satisfied when I say that I have commanded a vessel, and have therefore I trust omitted nothing of consequence. The logs themselves will be sent to Europe for the use of Mr. Babbage or Col. Reid.

No. 1.—*In Calcutta.*

The Meteorological registers from the Surveyor General's Office—the notes on the weather I have added as it appeared within the town.

1839.	Bar. at Noon.	Ther.	Winds.
June 1st	29,536	92·7	NE. Cumuli, Squalls from the NE. with rain.
2	,, 475	90·8	EbS. Cum. Strong squalls and rain.
3	,, 428	89·10	..... Fresh gales with squalls.
4	,, 400	86·7	EbN. ..... A gale with very severe squalls & rain.
5	No Registers.		ESE. ..... Strong squalls veering to SEd.

No. 2.—*Diamond Harbour. Latitude* 22° 11′.

On the 1st June, Light variable airs. 2nd, Variable, cloudy, and frequent rain. 3rd, NE. breezes and rain. 4th, Strong NNE. breezes and frequent rain. 5th, Strong gales and squally East to SSE. and heavy rain. 6th, Wind at SSE. and cloudy. Thermometer from 1st to 6th 83° to 85°.

No. 3.—*Kedgeree. Latitude* 21° 52′ *north.*

June 1*st.*—Light variable Easterly winds, cloudy, and rain, thunder, and lightning. 2nd, Cloudy, N. Easterly squalls and rain with calms, heavy rain, thunder and lightning. 3rd, Heavy squalls from North to East and rain, very unsettled appearance. 4th, Heavy Easterly squalls and rain, unsettled weather. 5th, Smart gale from SE. to E. and rain. 6th, Strong breezes, SE. to S. and cloudy.

No. 4.—Hon'ble Company's Upper Light Vessel "Hope," A. C. Hudson, in Latitude 21° 26′ north.

1st June, Civil Time.—Winds light and variable all round, with some rain. 2nd, Light winds during the first part; at noon heavy squalls from the East, with rain and thunder; latter squally, with wind from the Northward at times. 3rd, First part variable and squally from E. to N.; in the morning, wind increasing from NE. with heavy squalls; noon wind ESE. inclining to a gale; at sunset gale from E., and during the night from ENE. with heavy sea; vessel riding with 160 fathoms cable. 4th, Gale continuing in heavy gusts from Eastward and shipping seas fore and aft. Till noon the same weather, but wind at ESE.; at 8 P. M. gale veering to SE. with dull loomy weather, and at midnight gale at SSE. 5th, To day-light gale blowing very hard at SSE. veering latterly to S. in heavy squalls, with dismal weather and a heavy sea on; vessel shipping water fore and aft; at noon gale decreasing, with rain at sunset. Toward midnight strong breezes at S. with very heavy sea.

I shall in another part of this paper refer to the very instructive barometrical observations annexed to this log, which are highly creditable to Mr. Hudson's attention.

No. 5.—Hon'ble Company's Lower Light Vessel "Beacon," Latitude 21° *Longitude* 88° 27′*—J. Davenport, Commander.*

1st June, Civil Time.—A. M. light winds E. to NE. with heavy clouds to the SW., middle and latter parts moderate breezes, NE. to ENE. cloudy, unsettled weather and a heavy swell.

2nd.—Mostly moderate ENE. breezes, with cloudy unsettled weather, and a heavy sea rising; at midnight blowing strong; heavy squalls from ENE. with rain, thunder and lightning.

3rd.—Wind mostly from ENE. veering latterly to E. in the squalls. A. M. blowing hard, and increasing latterly to a gale, with a heavy sea; vessel shipping water fore and aft. *4th*, Gale veering from ENE. to E. and ESE. with severe squalls and a heavy sea; every appearance of a heavy gale; middle and latter parts blowing a gale SSE. to ESE. with heavy squalls of wind and rain; a heavy sea, and dark, dismal, threatening appearance all round. Kept the whole of the crew on deck during the night; riding with 200 fathoms of cable. *5th*, Gale moderating, but still blowing heavy and in hard squalls from SSE. to SE. with a heavy sea; latterly wind from SSE. to S. blowing hard and in squalls, with dark passing clouds and heavy sea;

vessel rolling and pitching very much, riding with 200 fathoms c cable. 6th, Strong southerly breezes and squally.

*No. 6.—H. C. Pilot Vessel "Jane."**

1*st June*, 1839. *Civil Time.*—On the cruising station off Poin Palmiras, winds light and variable, cloudy to the North and East ward. 2d June, Throughout fresh breezes and squalls with rai from the Northward, and threatening appearance to the Eastwarc anchored near the Floating Light Beacon. A strong current t the Westward. 3rd June, Throughout strong gales with rain an very threatening appearance to the NE. 4 A. M. Fresh gales fro NE. Noon, gale increasing; riding with 170 fathoms cable. 4th Jun Throughout hard gales E. to ESE. with heavy rain and threatenin appearance all round; noon, blowing hard from E. to ESE. win SE. in squalls with heavy rain and threatening appearance. Vesse driving, let go a second anchor. 5th, Strong gales from SE. to S heavy rain and threatening weather, latterly squally from SSE. to S 6th, Moderate breezes from South.

No. 7.—H. C. Cruizer "Amherst," J. Paterson, Esq. Commander.

Memorandum of the state of the winds and weather from the 29t May to the 6th of June at the head of the Bay of Bengal, as ex perienced on board the H. C. Ship "Amherst" on her voyage fron Arracan to Calcutta, 1839.

29*th*. Started from Akyab at day-light with freshening breez from E. to NE. and rain at intervals; the mountains covered hal way down with thick white clouds; at sunset weather much clearer the sea smooth, the wind decreasing, throughout the night very fine.

30*th*. The weather become perfectly clear, without rain; the sam appearance in every direction; horizon interspersed with very ligh still clouds, light Easterly airs and calms, sea smooth, the ship goin from one to three knots per hour; at 8 P. M. sharp flashes of lightnin to the ENE.; the night continued fine and very clear, little vari ation in the wind. Long. 90° E. lat. 20° 39′.

31*st*. Day-light sharp lightning to the Eastward, wind increasin from that quarter; the weather began to settle down for rain at noon variable sharp squalls from SE. to NE. with a good deal of rain

* The European reader, into whose hands this may fall, requires perhaps to be tol that the Honorable Company's Pilot vessels, at the mouth of the Hooghly, are no Pilot-*boats*, but fine stout Bombay-built Brigs of 250 tons, perfectly well manned an provided in all respects, and officered by able seamen duly educated to their profession

under and lightning to the Eastward ; sunset, the wind steady from e Eastward, with smooth sea, occasional showers during the night, ghtning very vivid to the Eastward, sometimes sharp flashes of lightng to the South.

1*st June.* The weather very similar to yesterday, more sea, very arp lightning during the night to the NE. ; 8 P. M. Outer Light essel bearing NNE. about nine miles distant.

2*nd.* Heavy squalls from NE. to NNE. during the early part of e morning ; 10 A. M. wind steady from ENE. weather more hazy id sea rising ; 4 P. M. wind NE. by E., sharp lightning to the ENE. ; inset, Outer Light Vessel SE. by E. six miles ; 8 P. M. Light Vessel . by N. ; heavy squalls from the NE. with sharp rain, ship under ouble reefed topsails, the weather threatening throughout the night.

3*rd.* Day-light heavy squalls from the ENE. ship under double efed topsails, sea rising fast with rain ; noon, off the tail of the Eastern ea Reef; gale increasing from ENE., ship standing out under three efs in the topsails, top gallant yards on deck ; at 8 P. M. split the psails, reefed the courses, the wind steady from ENE., heavy sea id the gale still increasing with rain, no lightning up to midnight.

4*th.* 2 A. M. ship reduced to main courses, wind ENE. heavy usts of winds and rain ; 4 A. M. a hard gale at ENE. ship louring much ; 6 A. M. gale still increasing ; at 11 A. M. ship under ire poles, wind ENE. ; 3 P. M. wind E. ; 3° 30′ P. M. wind ESE. ; P. M. wind SSE. ; blowing a perfect hurricane ; 6 P. M. wind outh, a tremendous cross sea ; ship at this time off "Codgone Point," p to midnight blowing a perfect hurricane from South to SSW. no ghtning nor thunder.

5*th June.* 2 A. M. gale began to moderate from SSW. with heavy oss sea ; noon, longitude 87° E. latitude 20° 3′ N. ; ship throughout ie remainder of the day under foresail and close reefed main topsail ith dry weather but very hazy, the sea very high.

6*th.* The wind steady from SSW. and hazy.

Remarks.—The 30th May led me to be very watchful of the weaher, it became so extremely clear and such a sameness in the appearance all round ; the stars very bright, the clouds stationary and of very light appearance, the lightning very very sharp, the noise of every hing on board seemed to be more than ordinary. What was most remarkable, the wind continued so steady from the Eastward at one time n the 4th that I had most serious apprehensions of the ship drifting on hore upon the western shores of the Bay ; the wind shifted suddenly, therwise nothing but her anchors could have saved her.

J. PATERSON, *H. C. Ship "Amherst."*

No. 8.—*H. C. Pilot Vessel "Krishna," Mr. J. Crook, Branch Pilot, Commander,—at the Cruising Station.*

2*nd June*, 1839. *Civil time.*—NE. to E. squall and threatening to the Eastward. 3rd June A. M. freshening fast NNE. to NNW. with dirty weather; noon fresh gale NNW. to NNE. at. 20° 10′; weather threatening stood off the land. 4th Wind N. by E. at noon hard squalls and rain; gale increasing to 8 P. M. Midnight wind N. and gale apparently breaking. 5th A. M. Threatening again, and an increasing gale NNE. to NNW. till noon. P. M. hard gale, hove too under main topsail and fore topmast staysail, at 8 under bare poles; a man washed overboard but saved. Wind from N. to W. and SW. 1 P. M. *a dead calm!* with a high cross sea rising perpendicular, caused by a heavy roll coming up from the SW. against the northerly one; vessel labouring very much; at 1° 30′ P. M. wind suddenly veered round to the SW. and blew a furious gale with severe squalls and heavy rain till night. 6th A. M. gale moderating. At noon clearing up. Wind WbS.

No. 9.—2*nd June*, 1839.

Brig "*Sarah*" from Rangoon stood in on the evening and took a pilot on board, but the weather being suspicious stood out to seaward.

3*rd June.* Throughout the night hard squalls ENE. and rain. At day-light every appearance of an approaching gale, high sea, and hard squalls; noon, lat. 20° 30′ N. in 46 fathoms (about long. 88° 02′ E. Strong gales ENE. and high sea; at midnight hard gale about E. vessel struck by a sea abaft, and jolly boat carried away.

4*th June* A. M. constant hard squalls and gale about ESE. till noon; P. M. more moderate; at 2 P. M. wind veered to the Southward with rain; at 4 P. M. increasing gale, furled all sail, hove too under bare poles; at 9 P. M. Bar. 28° 88′; and to midnight hard gales veering round. Barometer 28° 56′.

5*th June.* Day-light moderating; towards noon fresh gales SSW and clear with high sea. Lat. 19° 42′ N.

No. 10.—*Honorable Company's Pilot Vessel "Saugor," Mr. J. Cearn, Branch Pilot, Commander.*

2*nd June, Civil time.*—At anchor in nineteen fathoms, off Point Palmiras bearing about NWbW. 1 P. M. a squall from the Eastward; till midnight pleasant.

3rd June.—A. M. squalls from NE. and ENE.; at noon strong eezes and a heavy swell from SE., but wind N.; gale freshening, d at midnight from NE.

4th June.—Increasing fast from NE.; at noon NE.; 8 P. M. ENE. hard gale at E. and heavy sea at midnight.

5th June. 4—A. M. wind E.; noon ESE.; hard gale veering to SE. d SSE.; moderating at midnight. On *6th June* A. M. wind South.

No. 11.—*Pooree, or Juggernaut Pagoda,* 19° 48′ *N.*, 85° 45′ *E.*

Letter from Dr. Cumberland, Surgeon of the Station, who after gretting that he can give but imperfect information, says,—

"The *2nd of June* was very cloudy; about 11 A. M. we had a heavy quall from the E. afterwards a succession of others, from almost very point of the compass. At night it was blowing hard from the E.; and on the *3rd,* we had a hard gale from the N. with heavy ouds and rain. *On the 4th,* still blowing a hard gale from the N. ith heavy clouds and incessant rain; at 5 P. M. the wind shifted ıddenly to the W. and gradually veered round to the SW. after hich it moderated, still however blowing a gale. *On the 5th,* the ıle continued from the SW. very cloudy but no rain. *On the th and 7th,* fresh breezes from SW. with very cloudy weather. *)n the 8th,* light winds. The quantity of rain which fell on the 2nd f June was 1 inch; on the 3rd, 2 inches and 1-10th; on the 4th, inches and 9-10ths.

Pooree, *6th July,* 1839.

No. 12—*Letter from Captain Hookey of the ship "Mary Somerville," 15th June,* 1839, *accompanying his log.*

I have much pleasure in communicating any information in my ower respecting the gales in the Bay of Bengal on the 3rd, 4th, and th June, in which the "Mary Somerville," and several other vessels appened to be. Although the gale with us appears to have been of hort duration, it was very severe. We experienced ever since cross- ıg the equator, (which we did on the 20th May) hot sultry weather, ith variable winds from N. to W. chiefly. On the 3rd June, at oon, latitude 19° N. longitude 85° 29′, wind very unsteady, both in trength and duration, with heavy squalls chiefly from NW.; occa- ional heavy rain. Ther. 86°, Bar. 29° 25′, Simp. 29° 40′.

4th June.—Fresh gales from W. with heavy rain; at noon Ganjam NWbW. twelve miles. Ther. 86°, Bar. 29° 15′, Simp. 29° 30′. It ontinued to blow a fresh gale but not a severe one, wind from W. to VSW.; at this time a heavy sea from SE., ship lurching very much.

5th June.—Strong breezes; ship under double reefed topsail wind SW.; at noon Juggernaut Pagoda NE¼E. eighteen miles; 5° 30′ P. M. the Black Pagoda bore NWbW½W. fifteen or sixtee miles; wind now increasing to a severe gale at S.; hove the shi too under easy sail; head from ESE. to EbN. but the wind dre gradually round to the SW.; the sea continued at SE. and the sh laboured most tremendously; at midnight it began to moderate, an blew a fresh breeze from SW. which carried us to Point Palmiras b 5 o'clock P. M. on 6th June. When the severe part of the gale com menced at 5° 30′ P. M. 5th June, the Black Pagoda bore NWbW½W sixteen miles; the Ther. was 86°, Bar. 29° 10′, Simp. 29° 25′; th lowest we had it; and it began to rise at 10 A. M., Simp. first, the Bar. about an hour after. We must have escaped a great part of th gale as the SE. sea was very high, but we never had the wind fro that quarter; the severe part with us was from SSW.

Captain Hookey says in another letter to me—the reason of ou laying too so much was not caused by stress of weather, but from ou having carried away our fore topmast, and fore and main topgallan masts in a severe squall from the NE. on the 2nd in the afternoon; therefore laid too till the ship was again prepared to run for th Sand Heads ————.

No. 13.—*Ship "Justina," Extract from her log forwarded by Cap. T. H. Bentley.*

3rd June, 1839.—*Nautical time.*—Monday night at 2 A. M. squally in royals and flying jib (ship's head NEbE. wind NNW.) in fo and mizen topgallant sails. At 5 A. M. heavy appearance to the N reefed the driver, sent down royal yards.

At 8 A. M., ship's head NE. wind NNW., gale increasing; in 2n reef of the topsails; at 9 A. M. heavy squalls with heavy rain; u mainsail; at 10 gale increasing, up foresail, in mizen topsail; heav squalls with rain; at noon ship's head ENE. wind N., furled main sail, wore ship. Lat. Obs. 19° 14′ N.

Tuesday, 4th June. Wore ship to the westward; at 1 P. M. ship head WSW. wind NW. strong breezes and squally, close reefed th fore topsail, furled the fore sail; at 3 P. M. gale increasing, in 3r reef of the main topsail, in driver; at 5 P. M. ship's head SWbW wind NW. heavy cross sea running, ship pitching heavy; at 6 ga increasing fast with heavy squalls and constant rain.

At 7 ship's head SW½W. wind NW.; at 9 ship's head SWbW pitched bowsprit under, carried away the jib boom, fore topgallan

mast and main royal mast; cut away the jib and flying jibboom; made the fore topgallant mast fast to the topmast rigging; at 11 hard squalls with a high sea running. At midnight ship's head SWbS. wind NW. At 2 A. M. severe gale, with a tremendous sea running; at 3 ship's head SW. wind WbN. the fore topmast staysail blew to atoms, ship lying with the lee bulwarks under water; at 4 heavy gales with severe squalls and constant heavy rain; at 8 bent another fore topmast staysail; at 9 A. M. ship's head SbE. wind WSW.) at noon hard and severe gales, the fore yard arm at times in the water.

Wednesday, 5th June. At 1 P. M. ship's head south; wind WSW. at 3 a heavy sea filled the quarter boat, the fore davit gave way, let the boat in the water, cut away the after fall the boat being stove; a heavy sea with severe squalls; at 5 P. M. ship's head SbE. wind SWbW. more moderate; at 6 wore ship to the NW.; at 7 set fore trysail; at 8 ship's head WNW.; wind SWbS.; at 11 more moderate, set the foresail; at 1 A. M. ship's head NW., wind SW. brisk gales with passing squalls and rain; at daylight got the fore topgallant mast and royal mast on deck; at 8 set fore topsail; at 9 out 3rd reef of the main topsail; at 11 got all clear, at noon moderate and cloudy. Lat. by Obs. 18° 15′ N. long. by Chron. 85° 11′ E.

No. 14.—*Ship "Ann Lockerby," Capt. Burt.—Extract sent.*

Tuesday, June the 4th. In lat. 18° 55′ N. and long. 86° 30′ it commenced to blow heavy; the wind from N. to NNW. the height of the barometer was 28° 75′ and raining heavy; the gale still kept increasing till the morning of the 5th at 8 A. M. when it blew a complete hurricane, the wind at NNW. and it shifted round to WSW.; about noon the barometer was standing at 28° 15′; the ship at that time was in lat. 19° 5′ N. and long. 87° 6′ E. J. BURT.

No. 15.—*Ship "Eden," Capt. W. D. Cook.*

3rd June, Civil Time—Lat. 18° 22′ N. long, 86° 1′ E. P. M. strong winds variable WSW. to WNW. with rain. Barom. 29° 40′. 4 P.M. the same; with a heavy sea running; wind west; 8 P. M. increasing winds, in jib, mainsail, and mizen. Barom. 29° 30′ ditto weather, wind N.; 4 A. M. strong winds and squally; wind NWbN.; 8 A. M. hard gales, wore ship to the southward, Barometer 29° 10′; noon ditto weather, sun obscured; wind West, under bare poles; 4 P. M. hard gales with heavy squalls and a tremendous sea running; wind SWbW. Barometer 29° 00′. *4th June.* Midnight blowing a perfect hurricane at WSW. without intermission. Barom. 28° 80′ 4. A. M. ditto weather

Barom. 28° 70′; 6 A. M. struck by a heavy sea which hove the ship on her beam ends, shifted a great part of the ballast, washed the man from the helm, and part of the bulwarks away. 8. A. M ditto weather, ship labouring heavily; set a storm mizen staysail Wind WSW. Barom. 28° 60′. Noon ditto winds, with continued heavy rain, Barom. 28° 60′; 4 P. M. gale a little abated, set the main topsail close reefed. Barom. 28° 70′; 8 P. M. heavy squalls with lulls at times. Midnight, more moderate; set the foresail. Barom 28° 80′ 4 A. M. Out two reefs main topsail, and set the fore out double reefed; 8 A. M. set the reefed mainsail; wind SW Barom. 29°. Noon, strong breezes and hazy with less sea. Lat. observation 18° 1′ N. long. Chro. 86° 52′ E. Barom. 29° 25′. *June 6th* Moderate weather; got soundings under the Black Pagoda at 2 A. M.

No. 16.—Masulipatam, 15th July, 1839.

DEAR SIR,—I have the pleasure to send you an extract from my Journal, we had neither thunder nor lightning, but there was a very heavy sea rolling in from the Eastward.

I have not a Simpiesometer.

RICHD. ALEXANDER.

Thermometer.		*Barometer.*		*June*, 1839.—*Masulipatam.*
Date.	Max.			Winds, &c.
June 1	87	29	700	From WNW. fresh, drizzling rain.
— 2	88	—	—	WNW. to SSW. do., very cloudy.
— 3	87	—	695	Ditto ditto ditto, drizzling rain.
— 4	83	—	633	Ditto blowing very fresh.
— 5	90	—	600	Ditto ditto ditto ditto.
— 6	91	—	625	Ditto to W. and SSW. very cloudy.

No. 17.—Extract from the log of the Brig "Nine," Captain Denny in the Bay of Bengal, June 1839.

Saturday, 1st June, Nautical time.—Strong gale throughout, with heavy squalls and showers of rain, wind WbS. No observation. Lat by account 14° 7′ N. long. 85° 28′ E., Bar. 28° 7′, Ther. 82°.

Sunday, 2nd June.—Heavy gale throughout, with constant rain and heavy squalls, wind WbS. No observation. Lat. by account 16° 7′ N., long. account 85° 52′ E. Bar. 28° 6′. Ther. 83°

Monday, 3rd June.—Strong gale throughout, with heavy squalls and rain. Wind WbS. No observation. Lat. by account 17° N., lon. 86° 16′ E. Bar. 28° 6′. Ther. 84°

Tuesday, 4th June.—First and middle parts strong gale, latter more moderate, wind WbS. Lat. by account 17° 36′, long. 86° 43′ E.

Wednesday, 5th June.—Fresh gale throughout, with heavy squalls and showers of rain. Lat. by observation 18° 39′ N., long. Chro. 88° 18′ E.: On getting an observation, found we had a set of 60′ to the southward during the gale; wind S. W.

No. 18.—*The ship "Elizabeth," of Glasgow, Captain Dewar; homeward bound, left the Pilot, according to her protest, on the* 29*th May.*

On the 2d June, in lat. about 16° N. and long. 88° E. she experienced a very severe gale from the SW. with a heavy cross sea; hove too; but the sea was washing over her continually. About midnight she was struck by a heavy sea on the quarter, which started the whole of her stern frame; she bore up with seven feet water in her hold to the NE. and on the 3rd again hove too with her head to the NW. The wind hauling to the SW. she bore up about NNW. for the Sand Heads but could only reach Lacam's channel, where the vessel was driven on shore and lost; the captain and crew reaching Calcutta in a state of great distress and exhaustion through the Sunderbunds.

No. 19.—*Ship "Jumna," Captain Robinson.*

1*st June, Nautical time.*—Lat. 12° 25′ N. long. 85° E. dark gloomy weather, with much lightning to the NWbN. and NE. quarters, the wind freshening to a gale from W. or WSW. The barometer had been falling for several days before.

2*nd June.*—Lat. 15° 20′ N., long. 85° 30′ E. The gale continuing from W. with much rain.

3*rd June.*—Heavy gale from W. to WSW. generally; with lightning and ceaseless rain, and looking awfully dark to the NW. and N. The wind at times offering to shift in that direction, but never got further than WNW. and only remained there for a short time. Lat. 16° 40′ N. long. 85° 30′ E. at noon.

4*th June.*—The gale continuing, but blowing more in heavy squalls, with torrents of rain. The barometer 29° 19′ inches, lat. 17° 10′ N. long. 85° 35′ E.; P. M. more moderate; wind SW. fair, with hazy weather.

No. 20.—*The Brig "Laurel Amelia"* from Coringa towards Chittagong left Coringa roads, 3*rd June, Nautical time,* at 5 P. M. with light southerly breezes and clear weather; during the night the wind veered to West; at noon it was West, with drizzling rain and strong gales. Lat. and long. omitted in this log.

4th June.—Westerly winds, strong gales, vessel under courses, stee ing Eastward. During the night increasing gale, ship labouring ver much; daylight the same, and weather very threatening, with a heav sea on; prepared every thing for bad weather; noon, hard gales. N observation. Lat. by acct. 16° 56′ N. long. 82° 58′ E.

5th June.—P. M. hard gales with drizzling rain, increasing at mi night to a hurricane from the Westward. Daylight, and till noon, scu ding under bare poles and laboring very much. No observation; lat. 1 22′ N. long. 83° 44′ E. by account.

6th June.—Towards sunset hurricane abating a little; at midnig moderating; daylight under the foresail; noon more moderate, set t topsails. No observation. Lat. by acct. 18° 19′. N. long. 84° 29′ On the *7th* the weather fine.

It is clear that this vessel, being on the south side of the vortex ma a fair wind of the hurricane; but the latitudes and longitudes must wholly erroneous, since, though scudding before a hurrieane from t Westward they give a NE. course made good along the shore! Capta Elson, of Chittagong, to whose politeness I am indebted for this l and that of the "Louisa" and "John William Dare," informs n that the last only is to be depended upon, as the Chittagong vessels a rarely provided with good instruments or able navigators. I have ho ever felt myself bound to mark the track as here given, though I thi it probable that on the 5th she was at least two degrees further to t Eastward, and I have therefore marked also her probable position.

The following very interesting remarks I received on the arrival the "*Mobile*" from the Mauritius. It will be recollected that this sh was one of the outward-bound; having left her pilot on the 23rd Ma I regret much that no latitudes and longitudes accompanied the fi letter, so that I could only mark this vessel's drift approximatively the chart as it was going to press; for this cause too this vessel omitted upon the diagrams of the gale.

No. 21.—*Extract from the log of the ship "Mobile," on a voyage fro Calcutta to Mauritius, forwarded by Captain Ogilvy.*

For several days prior to the *2nd June* the weather was for the se son of the year remarkably fine, and the wind instead of SW. w vecring round the compass. We had reached the latitude of 15° long. 84° E. in seven days from the Pilot. On the morning of t 2nd the swell increased considerably from the South, and at noon t mercury in the barometer, which had remained for some days steady 29° 90′, was affected, and commenced falling fast. At this time (noo we had a moderate breeze from the NNW. and the appearance of t

weather indicated not the slightest change. The breeze in the afternoon gradually increased, and at 4 P. M. took in one reef of topsails; Barometer 29° 55′. At 6 P. M. a very heavy black cloud rose in the Eastward; and apprehensive that a gale would come from that quarter, altered my previous course of SSW. to SSE. in order to get more sea room. At 8 P. M. the barometer had fallen to 29° 40′, and the wind a fresh steady breeze from the NW. with slight showers of rain: took in 2nd reefs. 11 P. M. The breeze completely died away, and for the next seven hours it was nearly calm, the barometer stationary, and the black cloud still hanging in the Eastward, with very vivid lightning issuing from it.

At 7 A. M. *3rd June* the wind sprung up again from the NW. and commenced blowing so strong that all sail was taken in, excepting the close reefed main topsail; and the ship hove too. Noon, strong gale, with very heavy gusts of wind from the West. Bar. 29° 40′. Took the main topsail in, and spread a tarpaulin in the mizen rigging. *4th June* do. winds and weather, with a very high sea; by account lat. 15° 50′ N. longitude 84° 40′ E. *5th June*, wind veering to SW. and producing a tremendous cross sea, the ship rolling and labouring much. Bar. 29° 5′. latitude by account 16° 20′ N. 85° 20′ E. P. M. The Bar. rising, and the wind veering to SSW. with more moderate weather. The sea at this time, from the altering of the wind, was running in three or four directions, with immense crested tops which threatened instant destruction; but fortunately at this time it commenced raining heavily, which had a great effect in reducing the topping of the waves. On the *5th June*, by observations latitude 17° 10′ N. longitude 86° 15′ E. Found that we had drifted to the NE. 200 miles.

D. W. OGILVY.

No. 22. Barque "Susan," Captain Neatby,—Nautical Time.

31st May.—Wind WbN. to WbS. Bar. P. M. 29° 60′; midnight, 29° 55′; noon 29° 50′, Ther. 79°. Strong gale increasing from yesterday, with violent squalls and rain every hour. Lat. noon 12° 47′, long. 90° 43′ E.

1st June.—Wind WbN. to WSW. Bar. P. M. 29° 50′; noon 29° 40. Ther. 79° to 76° hard gale with constant heavy squalls and rain, with heavy sea, ship laboring much. At noon hard gale and heavy squalls. Lat. 14° 2′ N. 91° 14′ E.

2nd June.—Wind W½S. to WSW. Bar. 29° 40′ to 29° 36′. Ther. 79° to 78′; hard gale and violent squalls, with rain, and a tremendous heavy sea; ship laboring much, sent guns, provisions, &c. into the hold; ship lurching dreadfully. Lat. 14° 47′ N. long. 91° 47′ E.

3rd June.—Wind W½S. to WbS. Bar. 29° 40′, 29° 33′, and 29° 40′ Ther. 60°; hard gale with violent squalls and rain, and heavy sea throughout. Lat. 15° and long. 92° 14′ E.

4th June.—Wind WbS. to WSW. Bar. 29° 40′; hard gale, violent squalls, rain and lightning; latterly the squalls more moderate. Lat 16° 19′ N. long. 69° 53′ E. By observation find a current to the SW at the rate of twenty miles per day for the last four days.

5th June.—Wind WSW. to SW. strong gale and squally, but moderating latterly, and the sea going down. Bar. 29° 40′ to 29° 56′ lat. 17° 59′ N., long. 88° 34′ E.

No. 23.—The ship "*Indian Oak,*" Capt. Rayne, left Madras roads at 10 A. M. 4th June 1839, Nautical time, having a passenger on board for Vizagapatam. She ran up along the coast with moderate breezes but on the night of the 5th to 6th June it was so very hazy that Capt Rayne could not obtain an observation; the heavenly bodies being obscured. His barometer fell from 29° 7′ at 8 P. M. on the 5th to 29° 6 at 4 A. M. on the 6th, the weather having assumed so very threatening an appearance, with a heavy jerking sea rising, that he prepared for bad weather, and kept under weigh whilst communicating with the shore, and landing his passenger at Vizagapatam; he had however no stormy weather. This vessel's log is important as marking, together with the memorandum from Masulipatam, that the gale was only *seen,* but not *felt* along the coast below Juggernath.

No. 24.—The Barque "*Lady Macnaghten,*" Captain George Hardwick, experienced a severe gale beginning with strong squalls from the West and heavy rain at noon 30th May 1839, lat. 10° 40′ N. long 88° E. By noon the next day, 31st May, in 12° 45′ N. 87° 14′ she was hove too under close reefed main topsail, and continued so under storm sails on the 1st, 2nd, 3nd, and 4th June; wind from WbS. to SWbS. blowing a very severe gale with very heavy sea, causing the vessel to labour excessively and ship water over all. At noon on 4th after which the gale moderated, she was in lat. 14° 51′, long. 88° 16′ E. and found that during the gale she had experienced a current of about thirty-two miles per day to the SW. from the 31st May to the 4th June; on which last day the Barometer being then at the lowest. stood at 29° 17′.

No. 25.—Brig "*Petrel,*" Capt. Turcan, *1st June* 1839. *Nautical time.*—At noon in lat. 5° 13′ N. long. 85° 20′ E. Bar. 29° 30′. Ther. 92′, strong breezes from WSW. and hazy weather.

2nd June.—Till midnight blowing strong. A. M. blowing hard with azy weather and a heavy sea; large white clouds driving very quickly, ut clearing at intervals; wind from WSW. to SW. at noon, when the at. was 8° 31′ N., long. 85° 50′ E. Bar. 29°, Ther. 86°.

3rd June.—Hazy in the afternoon, and first part of the night strong reezes, W. to WSW. till midnight warm weather. A. M. Hard gale, VbS. and a heavy sea till noon. Lat. 11° 26′ N., long. 85° 24′ E. Bar. 29° 48′ Ther. 95°.

4th June.—Hazy throughout and exceedingly warm. Sea high and onfused, *and coming at times from the northward!* Hard gales WbS. VSW. ship taking much water on deck. At noon, lat. 13° 44′ N. 4° 50′ E. Bar. 29° 43′. Ther. 86°.

5th June.—Wind WSW. to SW. P. M. Hard gales, but moderating atterly. A. M. confused sea from the northward, hazy; barometer alling at 4 P. M. to 29° 30′ but rising towards morning to 29° 50′. hip and rigging covered to day with a fine red dust.* At noon, lat. 6° 22′ N. long. 84° 34′ E. Bar. 29° 38′, Ther. 86°.

6th June.—Strong and hard gales WSW. with hazy weather. At 1h. 30′ made the land. Noon, lat. 18° 30′ N. long. 84° 34′ E. Bar. 9° 40′ Ther. 86° Sky clearing up, and sea going down with appearnces of settled weather. *Note.* We had not a drop of rain from leaving ie lat. of 2° 30′ N. on 29th May until in Saugor roads on the 9th June.

No. 26.—*Barque "John William Dare,"* Captain Gibson, *at anchor f the Island of Cheduba in* 3½ *fathoms water; on* 1*st June,* 1839. *ivil time.*—Lat. observed 18° 44′ N.; long. by three Chron^{s} 93° 50′ . Bar. 29° 80′, Ther. 85°. Latter part fine and clear. Bar. 29° 75, her. 84°.

2nd June.—First part light breeze and clear, with lightning to the outhward; daylight freshening breezes, with flying showers of rain d light squalls, barometer falling. At noon strong breezes with squalls, d dark threatening appearance. Bar. 29° 40′, Ther. 89°. 2 P. M. reeze increasing; preparing for bad weather. Bar. 29° 30′. Heavy sea lling in from the Southward, ship rolling frightfully. 8 P. M. Breeze creased to a gale with tremendous sea. The ship, though drawing ly eleven feet six inches water, struck by the heel and unshipped the dder, secured the rudder, slipt the chain, cast to seaward, and an-

* This is a singular phænomenon. The nearest point of the coast directly to windrd of the ship is about Coringa, distant 400 miles. It would seem to indicate that gale had blown over the table land of the Deccan, where it would probably find nty of red dust. The Laurel Amelia and Indian Oak seem thus to have been shelterby the Coromandel range of hills, as we see in the land breezes in an offing in e weather.

chored again in four fathoms water. Latter part weather as before. Bar. 29° 30′.

3rd June.—First part heavy gale from SSE. with a tremendous sea; vessel labouring heavily, and making thirty inches of water per hour Daylight, barometer rising; strong gale, with heavy thunder and rain, and dark heavy appearance all round; noon, gale abating, with heavy squalls, thunder, lightning, and rain. Bar. 29° 50′, Ther. 84°. Latter, gale abating, with heavy rain and a high sea. Bar. 29° 60′.

4th June.—First part strong breezes with squalls, thunder, and heavy rain; daylight, breeze abating; Bar. 29° 75′ Ther. 85°. Shipped the rudder, and sent up topgallant yards and masts. Latter part smart breezes. Bar. 29° 80′.

5th June.—Smart breezes from SE. and a high sea rolling in from SW.; made sail for Chittagong. The direction of the wind has been omitted in this log on the 1st, 2nd, and 4th, but it seems evident that it was from the S. or between S. and SSE. throughout. The log is very valuable, as shewing that the gale here, on the extreme Eastern side of the Bay, was at its height in the night between the 2nd and 3rd June.

No. 27.—Barque "Louisa," in the Harbour of Akyab.

Saturday 1st June, 1839.—Moderate breezes and cloudy weather Direction of the wind not stated, and nothing further in the log.

2nd June, 1839.—Commences with fresh breezes and cloudy weather; middle and latter parts, hard gales with small rain; wind Easterly.

3rd June, 1839.—During these twenty-four hours brisk gales and showers of rain; winds Easterly.

4th June.—During these twenty-four hours the same as yesterday

5th June.—During these twenty-four hours East winds with gales and falls of rain.

6th June.—For these twenty-four hours, SW. winds and moderate

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To exhibit the foregoing Logs in a collected view, for ready reference, I have arranged all the principal facts in the following series of Tables from the 1st to the 5th June, exhibiting thus at one view the weather experienced by the different ships, and their positions *at noon* on the same day. No account has been taken of the small difference of apparent noon occasioned by the difference of longitude, as there is nothing which requires this degree of exactness. It will be remarked that throughout the difference between the Easterly and Westerly winds occurs about lat. 19° 30′. The log of the "Indian Oak" is omitted, as not being of importance.

Date, Civil time.	Names of Vessels and Places.	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
June 1st. Noon.	Calcutta, ...	NE. Cloudy and squalls at times,	22..31	88..22	29·54	..	92	
	Diamond Harbour, ...	Light variable airs and Cloudy,	22..11	88..11	..	..	84	
	Kedgeree, ...	Do. do. Easterly do. do. thunder and lightning, ...	21..52	87..59	..	..	86	
	Upper Light Vessel, Hope, ...	W.toS. variable. Cloudy,.. ..	21..26	88..07	29·54	..	..	
	Lower Light Vessel, Beacon, ..	NE.toENE. Cloudy & unsettled,	21..04	88..27	..	..	..	Heavy swell.
	Jane Pilot Vessel, ...	ENE.toESE. Light & variable fine weather, ...	21..00	88..23	..	..	..	At anchor.
	H. C. Ship Amherst, ...	Variable sharp squalls from SE. toNE. with rain, ...	20..56	..	..	..	..	Sharp lightning to NE.
	Saugor Pilot Vessel, ...	NNE.toN. and cloudy to E. ..	20..28	87..32	..	..	..	At anchor, AM. winds SE. to southward.
	At Pooree, or Juggernaut Pagoda,	....	19..48	85..45	..	..	..	
	John William Dare, ...	Fine and clear, ...	18..41	93..50	29·75	..	84	At anchor off Cheduba.
	Mary Somerville, ...	NNE. to WNW. Light air, very hot weather, ...	18..13	85..17	29·65	29·78	86	
	Justina, ...							
	Ann Lockerby, ...							No Logs obtained.
	Eden, ...							
	At Masulipatam, ...	....	16..10	81..00	29·70	..	85	
	Nine, ...	W.bS. Strong gale with heavy squalls and rain, ...	14.. 7	85..28	28· 7	..	82	
	Elizabeth, ...							
	Jumna, ...	W.toWSW. Freshening to a gale. Dark gloomy weather, ...	12..25	85.. 0	..	..	..	Bar. falling. Much lightning to NW N. and NE.
	Susan, ...	W.bN.toWSW. Hard gale with heavy squalls and rain, ...	11.. 2	91..11	29·50	29·10	78	
	Lady Macnaghten, ...	W.bS.toSW.bS. a very severe gale, hove too under storm sail.	13..50	88..00	..	..	..	Heavy sea. Shipping water over all.
	Petrel, ...	WSW. Strong breezes and hazy,	5..13	85..20	29·30	..	92	

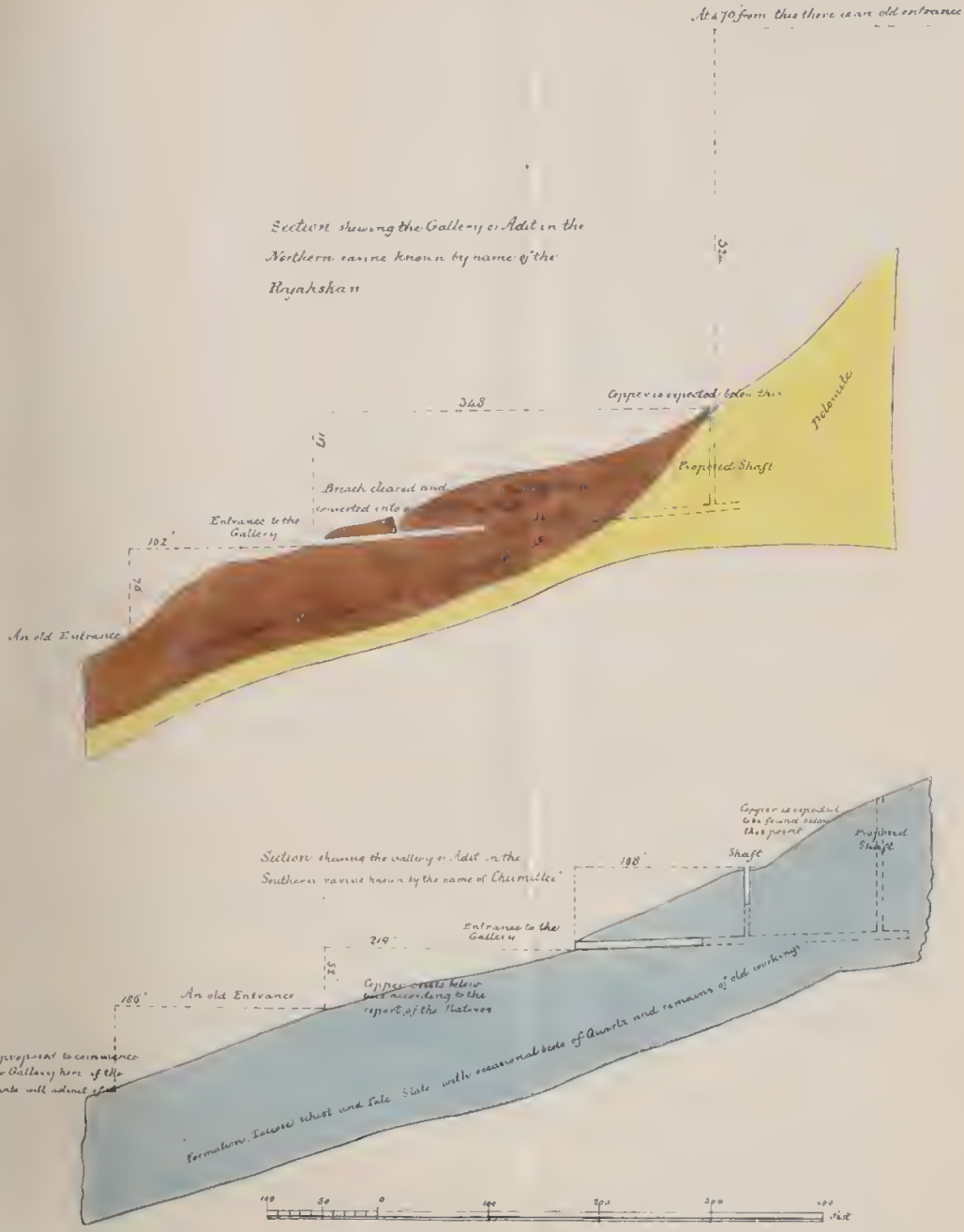
Date, Civil time.	Names of Vessels and Places.	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
June 2nd. Noon.	Calcutta, ...	E.bS. Heavy clouds and passing squalls with rain.	22..34	88..22	29·47	..	90·	
	Diamond Harbour, ...	Variable, cloudy and rain.	22..11	88..11	..	..	83·	
	Kedgeree, ...	Northerly with Easterly squalls, cloudy and rain, ...	21..52	87..59	..	..	83·	Calms, thunder and lightning.
	Upper Light Vessel, Hope, ...	Northerly wind, with heavy squalls from Eastward, ...	21..26	88..07	29·52			
	Lower Light Vessel, Beacon, ..	ENE. North breezes but threatening a gale,....	21..04	88..27				
	Jane Pilot Vessel, ...	Fresh from NE. with squalls and rain.....	21..04	88..23	..	..	..	At Anchor; strong set to the Westward.
	H. C. Ship Amherst, ...	ENE.toNNE. in heavy squalls and rain....	20..56	88..23				
	Krishna Pilot Vessel, ...	NE. to E. Squally and threatening to Eastward.	20..43	87..25				
	Saugor Pilot Vessel,..	Squally from the Eastward... ..	20..28	87..32	..	..	..	At anchor.
	At Pooree, or Juggernaut, ...	Squally from the Eastward... ..	19..48	85..45				
	John·William Dare, ...	S.bE. Strong breezes, squalls and dark threatening weather...	18..41	93..50	29·10	..	82·	At anchor at Cheduba. Bar. falling to 29·30; P.M. Heavy sea from Southward.
	Mary Somerville, ...	Lt. breezes WNW. to fresh from North.	18..56	85..56	29·61	29·73	85·	P M. Severe squalls from NE. car. away F. topmast and F. & Main T. G. Mast.
	Justina, ...	....						No Logs for this day obtained.
	Ann Lockerby, ...	....	..	..	..	..	..	
	Eden, ...	....	..	..	..	..	..	
	At Masulipatam, ...	Blowing fresh WNW. to SSW. Drizzling rain.	16..10	81..00	29·70	..	88.	
	Nine, ...	W.bS. Heavy gale, severe squalls and rain.	16.. 7	85..52	28· 6	..	83·	
	Elizabeth, ...	Severe gale from SW.	16..00	88..00	..	..	..	Heavy cross sea; stern stove in! bore up.
	Jumna, ...	West to WSW. Gale and rain.	15..20	85..30				
	Mobile, ...	Moderate from NNW.	16..20	84..30				

Date, Civil time.	Names of Vessels and Places.	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
June 2nd. Noon. (*Continued.*)	Lady Macnaghten, ...	W. b S. to SW.bS. Very severe gale. Hove too under storm sail.	14..10	88..00	..	..	..	Heavy sea.
	Petrel, ...	W S W. to S W. Blowing hard. Hazy weather.	8..31	85..50	29·00	..	86·	
Monday, June 3rd. Noon Centre of the Hurricane about Lat. 19·53 N. Long. 89·45 E.?	Calcutta, ...	E. b N. Fresh gale, heavy squalls and rain at times, ...	22..31	88..22	29·43	..	89·	
	Diamond Harbour, ...	NE. breezes, frequent rain, ...	22..11	88..11	..	..	81·	
	Kedgeree, ...	Heavy squalls N E. to East, rain and unsettled appearance.	21..52	87..59	..	..	81·	
	Upper Light Vessel, Hope, ...	Strong E S E. winds inclining to a gale at ENE.	21..26	88..07	29·11	..	..	Gale increasing rapidly PM. E. to ENE.
	Lower Light Vessel, Beacon, ..	Increasing to a moderate gale from E N E. heavy squalls,	21..01	88..27	..	..	..	Heavy sea on.
	Jane Pilot Vessel, ...	NE. Strong and increasing gales, with rain; threatening to NE.	21..80	88..23	..	..	..	At anchor.
	H. C. Ship Amherst, ...	ENE. Increasing gale and rain.	..	..	..	..	..	Sea rising fast.
	Krishna Pilot Vessel, ...	Pleasant and cloudy NE. to E.	20..37?	87..26?	..	..	..	Cross sea.
	Sarah, ...	ENE. Strong gale, and high sea.	2 0..30	88..02				
	Saugor Pilot Vessel, ...	N. Strong breezes.	20..28	87..32	..	..	..	At anchor, hvy. swell from S E. gale freshg. from N E at midnight.
	At Pooree, or Juggernaut, ...	N. Hard gale heavy clouds and rain, ...	19..18	85..15				
	John William Dare, ...	S S E. Heavy gale A. M. dark heavy weather, ...	18..11	93..50	29·50	..	81·	At anchor at Cheduba PM. gale abating; Br. rising; rain & hv. sea.
	Mary Somerville, ...	Very unsteady, mostly N W. with heavy squalls, ...	19..00	85..29	29·25	29·10	86·	
	Justina, ...	N. Increasing gale heavy squalls and rain.	19..11	86..06				
	Ann Lockerby, ...	....	..	..	29·40	..	..	No log.
	Eden, ...	Blowing strong W S W. to W N W. and rain, ...	18..22	86..01	29·69	..	87·	Barometer falling.
	At Masulipatam, ...	W N W. to S S W. Drizzling rain, cloudy, ...	16..10	81..00	28·6	..	81·	

Date, Civil time.	Names of Vessels and Places.	Wind and Weather.	Lat. N.	Lon. E.	Bar	Simp.	Ther.	Remarks.
Monday, June 3rd. (*Continued.*)	Nine, ...	Strong gale and heavy squalls W.bS.	17..00	86..16	..	..	..	Scudding for a port no log.
	Elizabeth, ...	Gale at SW.	..	..	..	..	..	
	Jumna, ...	Heavy gale from W. to WSW.	16..40	85..30	..	..	..	Lightg. & ceaseless rain, awfully dark to N. W. & N. wind offering to shift there.
	Mobile, ...	Strong gale and heavy gusts from the Westward, ...	15..00	81..00	29·40			
	Laurel Amelia, ...	Westerly drizzling rain and strong gales, ...	..	..	..			
	Susan, ...	W½S. W.bS. Hard gale, violent squalls and rain, ...	15..00	92..14	29·35	..	80·	
	Lady Maenaghten, ...	W.bS. to SW.bS. Very severe gale; hove too under storm sail.	14..25	88..00	..			
	Petrel, ...	W.bS. Hard gales.	11..26	85..24	29·18	..	95·	Heavy sea.
Tuesday, June 4th.	Calcutta, ...	East, heavy squalls and gusts with rain, ...	22..34	88..22	29·40	..	86	
At Noon. Centre of the Hurricane about 19·36 N. 88·10 E.	Diamond Harbour, ...	NNE. Strong breezes, frequent rain, ...	22..11	88..11	..	..	84	
	Kedgeree, ...	Heavy Easterly squalls, rain and unsettled weather, ...	21..52	87..59	..	..	85	
	Upper Light Vessel, Hope, ...	ESE. Heavy gale and rain, ...	21..26	88..07	29·33	..	..	Mdnight. veering to SSE. Heavy sea on, gloomy weather.
	Lower Light Vessel, Beacon, ..	ESE. to SE. do. do. rain.	21..04	88..27	..	..	..	Sea washing over every thing; gloomy appearance all round
	Jane Pilot Vessel, ...	From E. to ESE. and SE. Hard gale and rain, ...	21..00	88..23	..	..	..	At anchor; dark gloomy weather and heavy sea.
	H.C. Ship Amherst, ...	ENE. A hard gale and rain, ...	..	..	..	..	..	Under bare poles. At 1 P. M. a hurricane at SSE. tremendous cross sea.

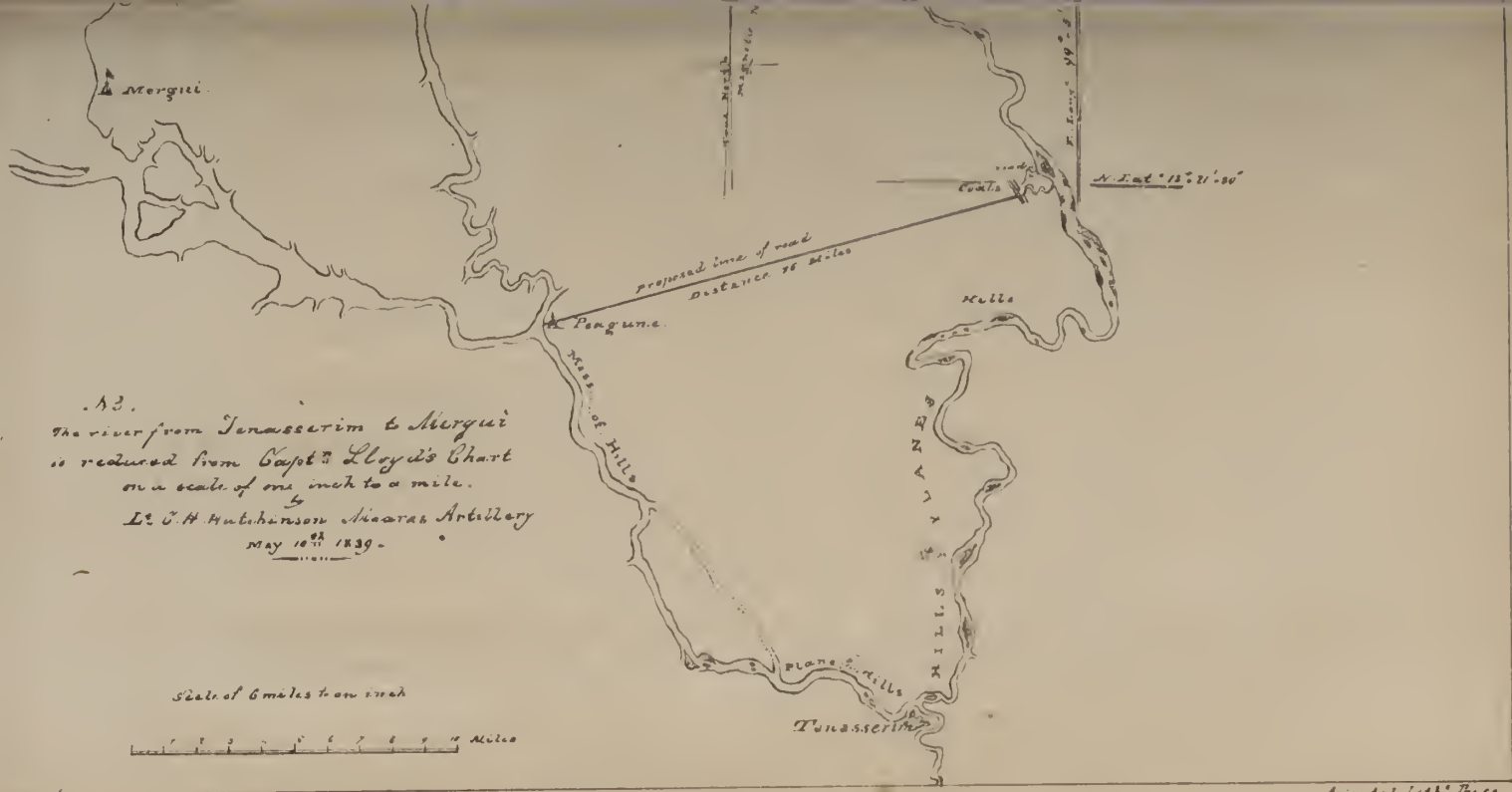
Civil time,	Names of Vessels and Places,	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
Tuesday, June 4th. (*Continued*)	Krishna Pilot Vessel, ...	NNW. to NNE. Fresh gales, hard squalls, ...	20..10	87..15?	..	..	..	High cross sea, stood off land.
	Sarah, ...	ESE. Hard gales with rain, ...	..	..	28·88 28·56	8. P.M. midnght	28	2 P. M. Wind veered to the South.
	Sangor Pilot Vessel, ...	NE. Hard gale, ...	20..28	87..32	..	..	..	At anchor, heavy sea.
	At Pooree, or Juggernaut, ...	North. Hard gale, incessant rain,	19..48	85..45				
	John William Dare, ...	South, moderate, ...	18..41	93..50	29·75	..	85	At anchor at Cheduba. 5 P. M. Shifted suddenly to the W. & veered gradually to SW.
	Mary Somerville, ...	W. Fresh gales with heavy rain,	19..16?	85..18?	29·15	29·30	86	Heavy sea from SE. P. M. gale increasing from SW.
	Justina, ...	WSW. Severe gale veering to South Westward, P. M.	18..47?	85..40?	..	..	..	Lying with yard arms at times in the water; tremendous sea running; lost a boat washed away.
	Ann Lockerby, ...	N.toNNW. Commenced to blow heavy and rain, ...	18..55	86..30	28·75	..	..	Gale increasing.
	Eden, ...	SW.bW. Hard gale increasing to a hurricane at WSW. ..	..	..	29·10			
	At Masulipatam.	WNW. blowing very fresh, ...	16..10	81..00	29.63	..	83	
	Nine, ...	W.bS. moderating to fresh gale,	17..39	86..43	..			
	Elizabeth, ...							
	Jumna, ...	From W.toWSW. Gale continuing and heavy squalls.	17..10	85..35	29·19	..	..	Preparing for bad weather.
	Mobile, ...	Heavy Westerly gales, ...	15..50	84..40				
	Laurel Amelia, ...	West, hard gales, ...	16..56	82..58	..	..	..	A current has been setting 20, to the SW. for the last 4 days.
	Susan, ...	WSW. Hard gale violent squalls	16..19	89..53	29·40			
	Lady Maenaghten, ...	W.bS.toSW.bS. Very severe gale; hove too under storm sails, ...	14..51	88..16	29·17	..	..	Current of 32 per day to the SW. for the last 4 days.
	Petrel, ...	W.bS.toSW.bS. Hard gales, hazy	13..44	81..50	29·13	..	86	Sea confused, and coming at times from the Northward, shipping much water

Date, Civil time.	Names of Vessels and Places.	Wind and Weather.	Lat. N.	Lon. E.	Bar.	Simp.	Ther.	Remarks.
June 5th. Noon, Centre of the Hurricane, about Lat. 19·25N. Lon. 87·1 E.	Calcutta, ...	S. b E. Veering to Southward, strong squalls and rain, ..	22..34	88..22	..	..	..	No observation for Barometer.
	Diamond Harbour, ...	E. to SSE. Strong gales & squalls	22..11	88..11	..	..	84	
	Kedgeree, ...	SE. to S. smart gale and rain,	21..52	87..59	..		85	
	Upper Light Vessel, Hope, ...	South; gale decreasing, rain,	21..26	88..07	29·46		..	Heavy sea.
	Lower Light Vessel, Beacon,....	S S E. to South, blowing hard in squalls, ...	21..04	88..27	..	..	..	Heavy sea.
	Jane Pilot Vessel, ...	SSE. to S. Heavy squalls, ...	21..00	88..23	..	..	..	At anchor.
	H. C. Ship Amherst, ...	Gale moderating from SSW. ..	20.. 3	87..00	..	..	..	Heavy cross sea.
	Krishna Pilot Vessel, ...	North to West and SW! hard gales.	19..40	86..27	..	..	..	1 P.M. Wind veered from N. to SW. furious gale.
	Sarah, ...	E S E. Moderating and veering round to southward ...	19..42					
	Saugor Pilot Vessel, ...	ESE. Hard gale, ...	20..28	87..32	..	..	..	At anchor; P.M. SE. & SSE. at midnight.
	At Pooree, or Juggernaut, ...	S W. Gale continuing, cloudy but no rain, ...	19..48	85..45				
	Mary Somerville, ...	S W. Strong breezes increasing to a severe gale to South	..	..	..	..	..	Veering to SW; P.M. Sea from the S. W.
	Justina, ...	SW. Moderating, ...	18..15	85..11	..			
	Ann Lockerby, ...	Hurricane at N N W. shifting suddenly to W S W. at noon.	19.. 5	87.. 6	28·15			
	Eden, ...	SW. Moderating.	18.. 1	86..52	29·25			
	At Masulipatam, ...	WNW. Blowing very fresh, ..	16..10	81..00	29·60			
	Nine, ...	SW. Fresh gale and heavy squalls, ...	18..39	86..18	..	..	..	Current of 60, to the S. during the gale.
	Elizabeth, ...	....	..	..	..	..	..	Running for a port.
	Jumna, ...	....	..	..	..	..	..	No log for this day.
	Mobile, ...	Severe westerly gale, ...	16..20	85..20	..	..	..	
	Laurel Amelia, ...	Westward, blowing a hurricane,	17..22	83..44	..	..	..	Scudding under bare poles.
	Susan, ...	WSW. and SW. moderating,..	17..59	88..34	29·40	29·56	83	
	Lady Maenaghten, ...	WSW. Moderating, ...	..	..	..	..	..	
	Petrel, ...	W S W. to S W. Hard gales but moderating, hazy, ...	16..22	84..34	29·38	..	86	At 4 P.M. Bar. 29·32 A confused sea from the North.


At 40 from this there is an old entrance
Section shewing the Gallery or Adit in the
Northern ravine known by name of the
Royakshan
348
Copper is expected below this
Peloruite
Proposed Shaft
Breach cleared and
converted into
Entrance to the
Gallery
102'
70
An old Entrance
Section shewing the Gallery or Adit in the
Southern ravine known by the name of Chermitlee
Copper is expected
but found below
this point
Proposed
Shaft
Shaft
188'
Entrance to the
Gallery
219'
160'
An old Entrance
Copper exists below
but according to the
report of the Natives
It is proposed to commence
a new Gallery here if the
Estimate will admit of it
Formation: Talcose schist and Talc Slate with occasional beds of Quartz and remains of old workings
100 50 0 100 200 300 400
feet
Almorah
3rd July 1839
For Journal of the Asiatic Soc.
T Mann Assistant Asst Surgn Cal
John Blagrave Lieutt
Ex Engr Kumaon Dv

From a Map by Mr. C. K. Hudson

Oriental Litho. Press. Calcutta



.12.

The river from Tenasserim to Mergui is reduced from Capt.n Lloyd's Chart on a scale of one inch to a mile.

by

Lt. C.H. Hutchinson Madras Artillery

May 10th 1839.

Lith.d on a scale half that of the original by Lieut.t N. Kittoe.

Oriental Lith.c Press

I have next delineated the whole of the tracks with the winds at on upon the general Chart, and from these are deduced the centres, hich last I have marked by a single circle or two for each day, and om the centres I estimate the course of the hurricane. To render the hole more distinct, three diagrams are also given, to half scale, upon hich I have a few remarks to make.

In considering these diagrams and tables, the reader will be struck ith some few anomalies; that is, he will observe that the arrows do ot always show the wind as blowing in *exact* circles, and that in ne or two instances, they are altogether different from the others, ough not absolutely contradictory.

I take these few discrepancies mostly to arise from some one of the llowing causes:—

I. The carelessness of many in noting the direction of the wind, or ne not noting it *at the time*.

II. Their erroneous estimation of its direction when looking at a eather-cock or dog-vane, and, if a ship is going fast, the not allowing r the effect of her motion upon it.*

III. On shore, local circumstances, such as houses, hills, rivers, and ne like, which may often produce differences.

IV. At sea the vicinity of the land, ranges of mountains, &c. which hen the gale or hurricane strikes them, occasion a re-action altering ne direction of the wind.

V. As it has been necessary to fix upon one instant of time at hich to compare the wind and weather experienced by different ves-ls, noon has of course been chosen; but when the winds are varying, it ay occur that the one marked about noon is a little more unfavour-ble to the appearance of the diagram than that which perhaps was the redominant one throughout the day; as, however, it would have ppeared like accommodating the facts to the hypothesis, I have pre-rred allowing them to stand as marked, taking a mean point where he limits of the variation of the wind are expressed, such as SE. hen the words "between South and East," are used.

VI. The positions of the vessels are rarely accurately ascertained in severe gale.

Let us consider these causes separately. The careless habits of eamen are well known, and that these should extend to what is pparently the unimportant matter of noting the exact direction of the ind is not surprising, and is well known to every intelligent man, ho has commanded a vessel. In severe weather too when a vessel

* The eddy wind from the mizen staysail will sometimes in a small ship affect the og-vane.

is lying with her yard arms in the water, boats and booms washi
away, and sails blowing from the yards, those on whom the respo
sibility rests have far other matters to engage their attention than t
exact direction of the wind; and in many vessels, where perhaps t
captain and chief mate are the only persons who can take charge of t
deck in such weather, the log is rarely marked till the gale ceases, a
it is written up perhaps at a still later period. "You must not loo
for very great exactness in my log, Sir, for to tell the truth, every wor
of it was written from memory after the gale was over; myself and t
mate had something else besides writing to do while the gale lasted,
was literally said to me by one commander; and no doubt this is n
cessarily true of many, as those who know the severe fatigue of bod
and excessive anxiety of mind which the masters of small vesse
must undergo in bad weather will readily allow.*

2nd. That when the vessel is going fast through the water the dog
vane shews the wind to be further a head than it really is, is wel
known to all; when close hauled on a wind, as the vessel lies about s
points from it, there is no mistake of any consequence to be made, bu
with the wind abeam or a point or two abaft it, many officers do no
if they know it, make due allowance for the ship's motion. If the win
appears to be abeam it is put down so, though it is perhaps half
point or more abaft it. The experienced and attentive do not of cours
fall into these errors; but how many are there who unite both experi
ence and attention? Looking at a weather-cock on shore, or merel
estimating the direction of the wind, is more liable to be inaccurate
even to the extent of a point or two.

3rd. Local circumstances, such as I have alluded to, require no re
mark, particularly when an observer is living in a large town, o
has not a very exact idea of his meridian; which but few have.

4th. This cause will be more particularly alluded to in Part II o
this memoir; at present with reference to one diagram the anomalie
about Juggernaut, or as the ships approach the shore, seem quite pro
bably referable to the repulsion of part of the vortex from the hig
land behind Cuttack; or to the great current of the regular monsoo
gale, blowing up along the Coromandel hills. See Part II.

5th. The fifth cause explains itself, as stated.

* *Note.*—While this is going to the press I meet in the Nautical Magazine fo
March 1839, in a valuable paper on a hurricane, "Yesterday I did not put down th
latitude and longitude. I calculated it roughly in my own mind, and satisfied mysel
the Barque was driving clear of the shoals. I was too much occupied, both mentally
and corporeally, to enter into minute calculations."—*Extract from a letter signed
'Mexicano,' giving an account of a gale off the coast of Mexico.—Nautical Magazine
March*, 1839.

6th. The sixth requires none to seamen, but the unprofessional rea-
er should be told, that, not only from the motions of the vessel and
ne haziness of the horizon, observations during stormy weather are
ntitled to but little confidence, but moreover they are but very
ldom obtained, the celestial bodies being rarely visible; thus the
titude and longitude of the vessel is in truth but little better
nan guessed at if she is lying to, because neither the direction nor
ne rate of her drift can be well *measured* by the log, or accurately
nown by the compass; as it may be when scudding. Hence it must be
orne in mind that, though the wind may be rightly noted, the ship's
osition may be to a certain extent erroneously laid down, and in some
nstances upon the diagram, if the vessel be supposed to have been
ttle further to the East or West, or to the North or South, the appa-
nt difference will disappear.

The Sarah in the diagram of the 4th is an instance. By the direc-
on of the wind she should be further to the Eastward; but I estimated
er to be where I have placed her. At 2 P. M. also, as will be seen by
er log, the wind veered to the Southward with her; the centre of the
ortex having passed her at no great distance; the weather moderating
ll 4 P. M. when it again came on to blow a hard gale.

It may be observed to, and this is important, that while probably,
nd frequently no doubt from the causes just enumerated, there are dis-
repancies in the winds as laid down, these rarely, or never, amount to
ontradictions of the theory; which defines a hurricane to be a severe
ale blowing and veering round in a circular direction, while it is also
noving onwards. I should note also that in more than one instance I
ave found no wind marked exactly at noon, but one at 10 A. M.
r 2 P. M. With this explanation of the diagrams and charts the
nprofessional reader will be better able to make allowance for the
ifferences he may meet with; and all will observe how well the
lank which occurs on the eastern side of them will be filled up by the
gs of the homeward bound vessels. The description of the Map No.
I. belongs to Part II. to which it has reference.

The slow rate of progress of our hurricane will not fail to be re-
narked. I think it probable this is owing to the vortices being *pent up*
s it were between the course of the gale and the Coromandel Hills. I
ave further adverted to this also in Part II.

A few more remarks on the Logs and Charts may not be without in-
erest, both to the unprofessional reader, and to the seaman who may
ot at once perceive how they bear upon the theory of the circular mo-
on of storms; and that this is from East to West by the North, or
ontrary to the hands of a watch, on the North side of the equator.

Let us begin with the H. C. S. *Amherst*, which we find very properly stood out to sea from the tail of the Eastern sea reefs. Had her Commander not been acquainted with the Sand Heads, she might have been placed in great danger by standing in, as she then must have anchored in a most perilous position. This was probably the fate of the unfortunate *Protector*, in which 135 soldiers were lost besides the crew and the passengers, in the gale of October, 1838.*

The Pilot vessels, whose business moreover it was to keep as near to their station as they could with safety, were well managed of course; as were also the *Sarah* and I believe the *John Hepburne*, a Schooner from Rangoon; though I have not been able to procure this last vessel's log.

On the South-side of the hurricane, however, many of the vessels seem running into it, and this some of them certainly did. The *Mary Somerville* was fortunately prevented from doing so, by the accident to her foretop-mast, obliging her to lie too, but the *Ann Lockerby*, *Justina*, and *Eden* seem to have run right towards it.

The *Susan's* track shows a course made much too far to the Westward for the winds laid down; this is only to be accounted for by the erroneous estimate of her position, and the Westerly current which I adverted to in the logs of the *Nine* and *Jane*.

The barometrical observations are for the most part so few and scattered that I have been unable to trace any connected series of them worth adverting to. As usual the barometer has clearly enough announced the approach or vicinity of bad weather, and the Simpiesometer still earlier. I have before stated that I was unable to obtain more than *one* single notice of the heights of the vessels' barometers in the port of Calcutta! and thus we are left to doubt as to the correctness of even those instruments of which we have the registered observations. Thus the 'Nine's' barometer indicated a very remarkable depression on the 1st, 2nd, and 3rd June, but was it a correct one? The low rate of pay on board our merchant ships makes it a heavy tax upon a commander to provide himself with instruments from the best makers. I cannot quit this part of the subject, however, without citing the highly creditable barometrical observations of Mr. Hudson, commanding the Honorable Company's Floating Light Vessel "Hope," marked in the tables as the Upper Light Vessel. I have only there quoted his barometer for noon; the following is the register annexed to his log, and brief notes of the weather from it —

* The remarks on the appearance of the Arracan mountains on the 29th, and the clear sky and peculiar sensibility to noise on board at the approach of the gale, are very interesting: the two last may have been electrical phænomena, and the first will remind the seaman of "the Devil's table cloth," at the approach of a South-easter in Table Bay.

3 June,	..	Bar.	
A. M.	..	29·56	East to NEbE. winds and cloudy to the WN.
oon,	..	29·54	NE to ENE. and cloudy.
P. M.	..	29·53	
4 June,	..	Bar.	
A. M.	..	29·53	ENE. cloudy unsettled, midnight heavy squalls from
oon,	..	29·52	ENE. with rain.
P. M.	..	29·47	
5 June,	..	Bar.	
A. M.	..	29·43	Strong NE. winds and threatening weather.
oon,	..	29·41	Strong ESE. winds inclining to a gale.
30 P. M.	..	29·37	Increasing to a gale; prepared for bad weather.
30 P. M.	..	29·33	
P. M.	..	29·33	Gale increasing at ENE.
6 June,	..	Bar.	
A. M.	..	29·33	Gale continuing in hard gusts from East.
A. M.	..	29·33	Weather as before.
oon,	..	29·33	Gale blowing in heavy squalls from ESE.
P. M.	..	29·33	Gale continuing, veering to SE.
idnight,	..	———	Gale veering to SSE.
6 June, 8 A. M.	..	29·46	Gale still continuing at SSE. veering to S.
oon,	..	29·46	Gale *decreasing* a little, wind at S.
P. M.	..	29·46	Strong breezes at S.

From the height of this Barometer on the 1st as compared with that at the Surveyor General's Office in Calcutta, we may assume it to be a nearly correct one; and if these dates are compared with the assumed track of the hurricane—at least at 120 miles distant from Captain Hudson's vessel—it is scarcely an exaggeration to say that this instrument was marking the passage of it over his meridian with the regularity of a clock! A stronger instance of the vast utility of the Barometer and the use of having them on board all stationary vessels could scarcely be adduced. A good Simpiesometer would have given us still more curious data. It is, I hope, becoming daily more and more evident that the owners of all vessels should be obliged to furnish them with good instruments of all kinds; and indeed if they knew their own interests they would always do so. The cost of a very small portion of the delay and mischief arising from damage occasioned by the want of one,—and these are frequently not losses falling upon underwriters,—would far more than repay the cost.* The seaman who is watching his Barometer is watching his ship; and watching it too in the most intelligent manner.

* Col. Reid's observation on this subject deserves to be quoted. "Every policy of insurance should bind the owners or masters of a ship insured to provide a Barometer, and the protest should be required to shew that it was registered at least once in every watch. But it ought to be registered oftener; and within the tropics, during the hurricane season, every time the log is heaved." I should add that a Simpiesometer ought always to be insisted upon also.

ART. V.—*Note on the "Trochilus and Crocodile" of Herodotus.*

To the Editor of the Asiatic Journal.

DEAR SIR,—As the recent very curious and instructive work of Mr. Wilkinson on *the Manners and Customs of the Ancient Egyptians* is likely to attain a deserved celebrity, it may be as well to correct a mistake into which he has fallen, as to a fact in natural history, particularly as it affects the credit of the Father of History, whose work, notwithstanding its imperfections in many other respects, will generally be found correct in all matters that came under the author's personal observation.

Mr. Wilkinson says, vol. iii. p. 79,

"Herodotus enters into a detail of the habits of the Crocodile, and "relates the frequently repeated story of the *Trochilus* entering the "animal's mouth during its sleep on the sand banks of the Nile, and "relieving it of the leeches which adhere to its throat. The truth of "this assertion is seriously impugned, when we recollect that leeches "do not abound in the Nile; and the polite understanding supposed "to exist between the Crocodile and the bird, becomes more improbable, when we examine the manner in which the throat of the "animal is formed; for having no tongue, nature has given it the "means of closing it entirely, except when in the act of swallowing "and during sleep the throat is constantly shut though the mouth "is open."

Now on this passage I have to observe, first, that I have seen many Crocodiles caught, but very few that had not many leeches adhering to the inside of their mouths, and that these insects also infest the *Argeelah*, and other animals which feed in the Ganges. Secondly these leeches are not the *Hirudo medicinalis*, which Mr. Wilkinson is probably correct in asserting not to be common in the Nile, as that species is not usually found in running streams. The leech in question seems to me (I speak with diffidence, being no entomologist) to belong to the genus *Pontobdella*, one species of which infests Cod Skate, and other fish on the coasts of England. I have no doubt these insects will be found as abundant in the Nile as they are in the waters of Bengal. Thirdly, Herodotus says nothing about the throat of the Crocodile, though his translator Mr. Beloe does. Herodotus says "the Trochilus entering the Crocodile's mouth devours the leeches," for his words are, ενθαῦτα ὁ τροχίλος ἐσδύνων ἐς το στόμα αυτο καταπίνει τὰς βδελλας·*

* Herod. Euterpe. clxviii.

The Crocodile is not said by Herodotus to be sleeping during the peration, as Mr. Wilkinson asserts, otherwise the observation, "that leased with the service, he never injures the Trochilus," would be bsurd—*ωφελεύμενος ἥδεται καὶ οὐδὲν σίνεται τὸν τροχίλον*.*

Fourthly, as to the polite understanding which Mr. Wilkinson resumes, this may appear strange to a person only acquainted ith wild animals as seen in showmen's caravans and menageries, ut not to those who have studied their habits in their native haunts. he facts relating to this subject are worthy of more consideration han I can give them, without deviating from my present purpose; I vill therefore only add, that I believe the common Paddy bird of Bengal to be the Trochilus of Herodotus, or a bird of the same genus. Now both Europeans and Bengallees agree in asserting, that this ird is constantly seen standing on the head of the Crocodile, and hough I never heard any one assert that he saw it in the act of icking his teeth for him; I think it will be admitted that the visit is ot without an object.

I am, dear Sir,
Yours very truly,
W. C. Hurry.

Cossipore,
September, 1839.

Art. VI.—*Documents relative to the application of Camel Draught to Carriages; communicated by* C. B. Greenlaw, Esq., *Secretary to the Bengal Steam Committee.*

At a period when the applications of steam to locomotive purposes bsorb the attention of the civilized communities of the world, it may eem almost too late to propose new directions of animal power to this bject. The copious extracts we now publish from the documents of he "Steam Committee" and of other authorities, will place the subject n a different light. We willingly devote our pages to its consideration, n the conviction of its great value to all classes of Indian Society.

The discovery of the applicability of the Camel to the draught of arriages of every kind, we regard as one of surpassing value to coun- ries of the peculiar climate, and in the still more peculiar social tate in which India and Egypt exist, and through which for more than ne generation they must slowly and almost insensibly advance.

* Herod. Euterpe. clxviii.

To Major Davidson, of the Bengal Engineers, we believe must b assigned the signal credit of having first demonstrated the practicabilit of using the Camel for carriage draught. Some years have elapsed, sinc Major Davidson exhibited a Camel harnessed to a light car, on which h travelled at the rate of eleven to fourteen miles an hour, and execute daily stages of thirty-six miles for several days in succession. Encourage by this example, Mr. Bird, of Allahabad, constructed the carriage which we publish a striking sketch and plan, and in which he has a complished the tours described by Mr. Taylor, in his note published the present series of documents; for the illustrations we are indebted the kindness of the Hon. Mr. William Wilberforce Bird, of Calcutta.

In a subsequent number we hope to be enabled to publish interestin details regarding the Camel Artillery organized by Major Pew, a which, throughout the whole of the trying march on Cabul, has give such perfect satisfaction to the projectors of this important add tion to our military resources. Meanwhile, the papers we subjoi afford copious information on the practical points to be considered attempting to introduce this system on the great line of communicati through Egypt and in India. Under the auspices of the British Cons late, and the direction of Mr. Walne, we are sanguine as to the ear success of the attempt to establish across the isthmus of Suez a train vehicles in celerity only inferior to the steam vans, of which the Cam is the certain precursor.—EDS.

Extracts from a letter to CAPTAIN BARBER *from* ALFRED WALNE, Es *Vice-Consul in Cairo.*

Her Majesty's Vice-Consulate, Cairo, 17th March, 183

[*Comparative expenses of Horse and Camel draught in Egypt.*]

I question altogether the feasibility of finding persons in Egy willing and able to contract for a supply of one hundred and twe horses, to drag the ten vans, which are for the carriage of co to Suez, and of goods from that place. But supposing even that p sons were ready to come forward with the capital, it would be impos ble for them to find here horses suitable for such an undertaki The horses of Egypt, as experience has proved, are not in the le calculated for draught, and not at all accustomed to it; and even if th were, the wear and tear in this climate, more particularly in the deser

ould lead to a constant and serious loss. Supposing however that ne horses are provided, *and it is only England that can supply them*, e must calculate the annual cost, compared with the work they can erform, and again with that of Camels, which, whatever may be the pinion in Europe, are the best, because the natural means of convey- nce for a desert road. Premising that the following calculations are nly approximative, inasmuch as the price of provisions varies consi- erably from year to year, I proceed to offer you the following details f expense.

120 horses, being constantly employed for three hundred days of he year, will consume $1\frac{1}{2}$ roobs of barley per diem; in all 54,000 roobs, r 2,250 ardebs, of which the price has varied in the last two years rom p. 30 to 65, and even more. Taking it at the calculation of . 40 we have this result, 2,250×40 p. 90,000. Four-fifths of this eing for the stables in the desert, or for those in Suez, will require arriage, which, taking the long and short distances into full considera- ion, cannot be computed as averaging less than p. 15 the ardeb, or ,800×15= p. 27,000.

It is calculated that with the above supply of corn, each horse will equire *per diem* 4 okes of cut straw (tibne), which, purchased with he greatest advantage, will, at the Government price, cost 4 paras the oke. Thus 120×4=480×4=1,920, or paras 48 per diem—48×300= paras. 14,400.—

Of the 120 horses, 96 would naturally be either in the desert or at Suez, and it would be necessary to carry their supplies to those places; ow, though heavy *Belladee* Camels may carry 200 okes of tibne, it is air to calculate that three of the Bedouin Camels will not take more han 384 okes, or the day's supply. Thus 3×30= p. 90×300= p. 27,000, as expense of carriage.

Forty-eight, or $\frac{2}{5}$ of the horses being at Suez, or near the Nile, nay be supplied with water at an expense which need not enter nto calculation; but seventy-two, or $\frac{3}{5}$, being in the desert, will equire (unless boring or other means should supply new sources) hat water should be conveyed to them. Allowing for a little vastage, but on the other hand using the most serviceable (cow) kins, each horse will require a quarter of a Camel-load a day. Thus 18×30= 540×300= p. 1,62,000.

It is indispensable that horses in this climate should be turned out, ay for sixty-five days, to *Berseem* or clover. Each horse is allowed alf a feddan, and taking it at about the cost of the present year, . 400 (which happens to be unusually low) we have 60×400=

p. 24,000, to which we must add the expense of *rafeeahs* or guards, s of which, in addition to the ordinary attendants, will suffice to prote the animals from robbery. Estimating each at p. 100=100X6 p. 600.

For the management of the five stables there would be required o Nazir, or a general Superintendent, at p. 300 a month, five ch Saises, resident at the several stations, at p. 100; and ten stal assistants, at p. 60 each. In addition to these, I calculate that each s of four horses would require one good groom, to be always with ther and as much of his time must be passed in the desert, the montl wages of each cannot be estimated at less than p. 80. The tot annual expense for these men will be p. 38,400.

The horses will require shoeing at least once in 30 working day and supposing that this is done by contract, each set of *shoes* (Ara will cost p. 6. Thus 120X6= p. 720 a month, or in the year, p. 7,20

To meet veterinary, and minor charges, I add p. 2,200.

Summary.

		para
	Cost of 2,250 ardebs of Barley at p. 40, ...	90,0(
	Carriage of $\frac{4}{5}$ of do to Suez and other stations, ...	27,0(
	Cost of cut straw (tibne,)...	14,4(
	Carriage of $\frac{4}{5}$ of do. to Suez and other stations, ...	27,0(
	Carriage of water for 72 horses to do.	1,62,0(
60	Feddans Berseem, ...	24,0(
6	Rafeeahs or guards, 65 days, ...	6(
1	Nazir, or general Superintendent of horses, at p. 300 a month, ...	3,6(
5	Superintendent *Saises* at p. 100 do.	6,0(
30	Grooms, or *Saises*, p. 80 do.	28,8(
10	Stable Assistants, p. 60 do.	7,2(
	Shoeing 120 horses, at p. 6 each, ...	7,2(
	Veterinary and minor expenses, say, ...	2,2(
		4,00,0(

In the above calculation, nothing is put down for the wages of Eng lish carters—the wear and tear in harness and stable gear—the expens of water skins, which must be very great—the interest on outlay—or th loss in cattle.

But we may now calculate what work can be done with 120 horse kept at an annual expense of p. 4,00,000. It has been already ob served, that the animals are available for only about ten months of th

ır; and I consider, that, with due allowance for rest, each set of elve horses can make only one journey to Suez and back in ten days; other words, thirty vans might proceed to that place and return every nth, for ten months of the year. In the estimate it is stated, that each n will convey 15 tons admeasurement, the heaviest horses, however, uld have great difficulty in dragging forty sacks of coal, or five tons, ight;—thus 5×30=150×10=1,500 tons in the year; supposing en that there were 1,500 tons of goods to return from Suez, the ex- nse per ton, merely reckoning the keep of and attendance on the rses, would be each way p. 133 $\frac{13}{40}$, more in fact than that of Bedouin mel-hire for the same amount; coals being now sent to Suez for 132, and goods returning from there, at from p. 80 to 100.

Much misunderstanding appears to exist as to the nature of the ez road, which will be found on examination to be by no means lapted to heavy waggons, although there is nothing to interfere mate- ally with the transit of light carriages; always excepting the expense horses, in a climate in which they cannot do half the work that they ould in Europe. The first part of the road, for about ten miles, is in ality a deep sand, which would require very broad wheels to pass er; the rest is, with a few exceptions of sandy intervals, a tolera- y compact gravel. I should suppose much of the road would be cut up y only a few months passage of heavy vehicles, and that with little or chance of repair, so far as the Egyptian authorities are concerned. he want of water on the road adds enormously to the expense of transit here any other animals than Camels are used, and though it is possible, ut from the geological formation not very *probable*, that boring may ucceed on some points; it must not be forgotten that experiments ve already been made, (see Transactions of Geographical Society) d without any permanently useful result. In Mr. Holme's Report, pp. 21-122, this matter is however treated very lightly. Mr. H. says, another objection has been made, that there is no water between Cairo nd Suez; if this had to be carried, as it now is, for the supply of the ttle, &c. it would amount to a small addition in the cost of transit, at is all; but it can be shown from analogy that good water could be und by boring at any point on *this* line, and at about depth; nd were this not the case, or did it present a greater difficulty, 25,000*l.* r 26,000*l.* would lay down a pipe, the whole distance; and consequently rovide a *self-acting supply* from the Nile at any point where a plug ight be fixed." Mr. H. writing at a distance from this country, seems ot to have been aware that the principal level of the desert is more han sixty feet above the surface of the Nile, during the period of

inundation, and that several parts of the road are *still* higher. Howeve convenient therefore this self-acting supply may appear on paper we who are on the spot know very well, that the expense would not b any means be confined to so many miles of iron pipe, but that to rais the water to the requisite height, there would be a considerable outla for a steam engine, raised tank, &c., &c. in addition to which ther is nothing to prevent the pipe being injured or destroyed in any part o the road, whenever the Bedouins should wish to impede the carriag transit, on which they cannot look *with* very favourable eyes, deprivin them, as it would do in great measure, of the means of existence. Re flecting upon the subject of transit across the isthmus, I cannot to strongly urge on you the necessity of abandoning the van scheme, so fa at least as the carriage of coal and heavy goods is concerned. Till suc time as enterprise may have re-opened the ancient canal, or laid dow a rail road, I would advise you to use the means which this countr places at your disposal. Should the demands of the Egyptian Goverr ment, as I think is very probable, *so* far engross the Bedouin Camels a to prevent your hiring a sufficient supply, it will I believe be in you power to find persons in Egypt ready to purchase, keep, and furnish b contract, a sufficient number of heavy Camels, to carry across any quai tity of coal you may require, at about the present cost, as estimated i my report. The following sketch will however shew, approximatively what would be the expense to a Company, keeping its own animal in order to have a regular and certain supply entirely at its ow disposal.

Three hundred heavy camels, to be kept in good condition, will r quire, at the rate of a roob each, 300 roobs of beans daily, or say 3C days of the year, or 3,750 ardebs. The variation of prices has bee so great in the last few years, that it is difficult to estimate the averag but I put it down as double the cost of barley, which I reckoned p. 40 the ardeb, 3,750×80 p. 300,000.

Taking into calculation, that when crossing the desert Came brouse by preference on the prickly plants and shrubs which abour along the whole line of road, I estimate the quantity that will l required of cut straw *(tibne)* at 600,000 okes, which, at 4 paras the ok will cost p. 60,000. Each animal carries his own provisions, so th there is no extra expense upon this head, as in the case of horses.

For the above number of Camels at the rate of $\frac{2}{3}$ a fedden eac 200 feddens of Berseem will be required, which at p. 400 will co p. 80,000. During sixty-five days, 10 *rafeeahs* or guards must be en ployed, at p. 100 each, 10×100 p. 1,000.

To take charge of the Camels I allow one *Nazir*, or general superendent, at p. 300 a month; 3 *mukuddems* at p. 100 each; and 60 mel men at p. 60—making an annual outlay in wages, of p. 50,400, which must be added two men to mend the saddles, &c., at p. 70, or the year, p. 1,680.

Summary.

	paras,
Cost of 3,750 ardebs of beans, at p. 80, ...	300,000
Do. Tibne, ...	60,000
Do. 200 feddens of Berseem, at p. 400, ...	80,000
10 *Rafeeahs*, (guards) at p. 100, ...	1,000
1 Nazir, at p. 300 a month, ...	3,600
3 Makuddems, at p. 100 do.	3,600
60 Camel men, at p. 60 do.	43,200
Veterinary and incidental expenses, say, ...	4,600
	496,000

Not to overwork the Camels, I should allow ten days for the journey Suez and back again, the animals being loaded each way, and carryg a quarter of a ton each. In the three trips per month, they would nvey 250 tons of coal to Suez, and working only 300 days of the ar, would place at the depôt there 2,500 tons, being available to ing back a similar weight of goods from Suez. Calculating the carge of the former at p. 132 the ton, the latter would be about $73\frac{18}{40}$.

The great advantage in an establishment of this kind would be the gularity with which the coals might be transmitted to Suez; and the departure and arrival of the caravans would be entirely subject the Company's arrangements, all the packages landed from the eamer at Suez, might be immediately brought across the desert, and oceed without loss of time to their destination.

Any one who has long resided in this country, and has had opportuties of comparing the relative cost and utility of Horses and Camels; ll have no hesitation in deciding in favor of the latter. The Camel is most hardy animal, carries its supply of water in its stomach and its ans upon its back, browses on prickly shrubs no other animal can uch, and does not ever require a shade or covering to its resting place. hese are qualities which even the English horse most certainly does ot possess, and if ever the communication between Cairo and Suez is be made by vans, it is the Camel and not the horse, or even the mule, at must be harnessed to them.

In the event of a Company requiring a Camel establishment of their own, the agents must not be allowed to purchase the village Camels that are to be found in the neighbourhood of Cairo. Such animals, although very heavy, appear to have lost somewhat of their natural habitudes, and to be less fitted for the desert than those of the Bedouin breed. It would be necessary to send persons of competent knowledge to the Bisharee desert or the Sennaar, where Camels are good, plentiful, and cheap. Some losses in bringing them down would be unavoidable, and it is but safe to calculate a good stud of well chosen, strong, heavy Camels as averaging not less than 15*l.* a head.

(*Signed*) ALFRED S. WALNE

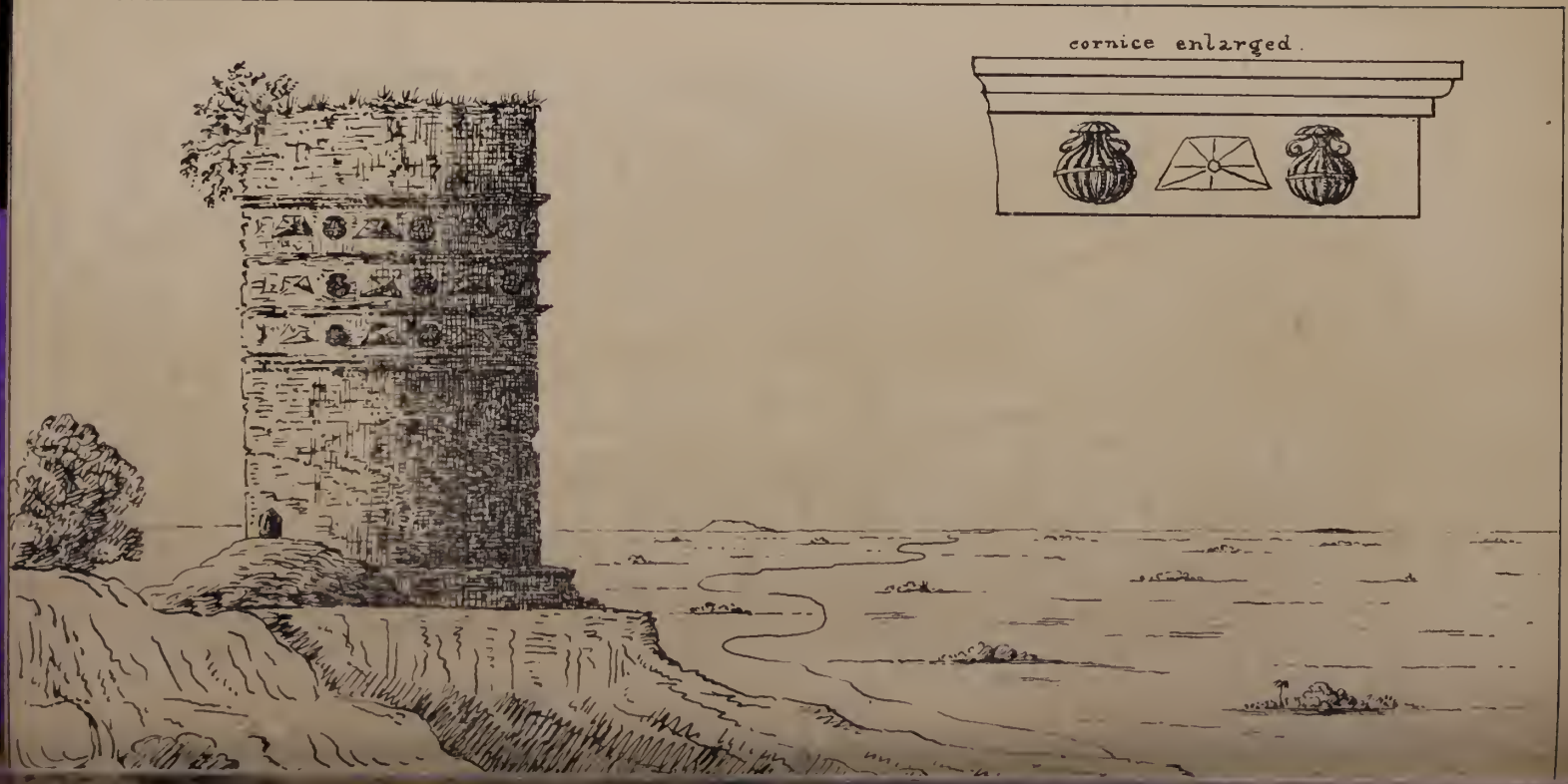
Memorandum on Camel Draught and Harness. By Captain TAYLOR, *late Agent for Post Office Inquiries.*

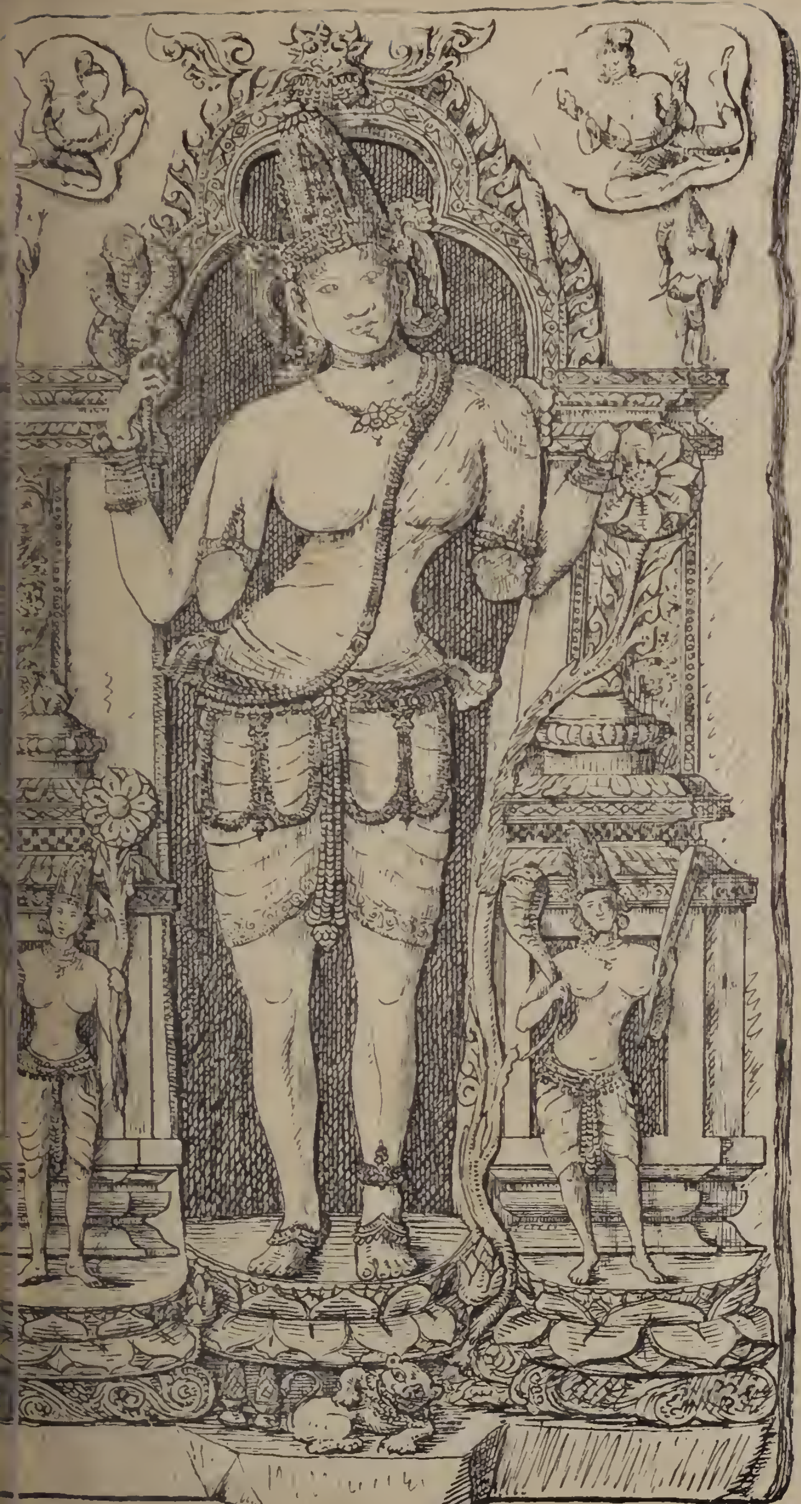
The recent discovery of the efficiency of the Camel in draught, is a point of singular moment in respect to overland communication. Mr. Bird, the able and intelligent senior member of the Board of Revenue at Allahabad, has recently made the tour of Upper India in a carriage drawn by two, three, or four Camels, as circumstances rendered their power necessary. The more usual number in harness, was three. The carriage was a light britska on four wheels, each of five feet diameter, with a dickey fore and aft, and a well for baggage. The carriage conveyed Mr. Bird and his lady, and four servants, and baggage consisting of beds, tables, portable chairs, crockery, cooking utensils, wines, &c., and clothes, writing apparatus, and official documents. They travelled at from thirty-six to forty miles per day, going half the above distance in the morning, and half in the afternoon. Either half was usually performed in from three to four hours; the pace averaging about six miles per hour, when the road was good; and about four and a half, or five miles per hour, when the road was indifferent. In deep sand, the pace would of course be less; but in sand, such as the desert is represented between Suez and Cairo, I should think five miles per hour might be easily obtained. I made some experiments myself while in Upper India, in respect to the Camel in draught, which I here take the opportunity to mention.

First, in respect to conveyance of baggage. Secondly, in respect to conveyance of men.

A small frame composed of strong bamboos was placed on a pair of wheels, and balanced much in the same manner as the ekkas in the North-West Provinces. On this was placed a large stout tin box

JARASANDA'S BYTHKÌ at GIRIÈK - BEHAR.





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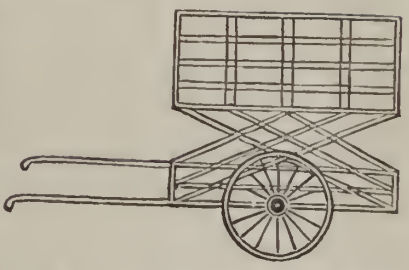


a wooden frame, four feet ure by two and a half high. A Camel was then brought, pped just as a common karec Camel, but having nall loop on either side he saddle, into which the x of the shafts was passed. Camel was mounted, and eu of putting baggage into the van, we put four men and started The Camel moved away with it at the rate of full six and a half s an hour, and trotted gaily all round the stony and uneven surface large compound. We then proceeded some distance along the road, the Camel van was found to answer admirably.

The next day we tried a four wheel conveyance for passengers. It a light carriage, something between a palanquin carriage and a ole bodied coach, with rattan-work blinds, which let up and down, excluded the glare, while they let in the breeze. It had a ll dickey in front, and afforded excellent accommodation for two ons and their servants, and a couple of carpet bags, and minor &cs. this we harnessed two Camels, the pole being attached to one side ach saddle, and a bamboo trace being fastened to the other side. Camels were mounted, and Dr. Ranken—the ingenious inventor, and e mover of the whole—and myself being seated inside, and a servant the dickey, we started, and drove half round the city walls of i, then entered the gate and drove through the Chandrichouk, to no small surprise of the natives: our pace being somewhat more n seven miles an hour. We returned home after a drive of some six seven miles. The next evening a second experiment was made. ee miles were measured from the Cashmere gate. The road was tly good and smooth, but by no means level, the load about thirty e; the carriage started, and completed the entire three miles out, three miles back, total six miles, in thirty-eight minutes;—nine and lf miles per hour.

Again I left Delhi en route to Allyghur, and after crossing the river, ted in the above mentioned carriage with two Camels for Dadree, dis- a. twenty-two miles. The first eighteen miles were certainly as gh a road as I ever remember to have passed in a wheel conveyance, in places indeed was so bad, that I was compelled to quit the road, drive through the fields. The last four miles were good. The le distance was performed in four hours and twenty minutes,

including a detention of about ten minutes in crossing the Hindo river.

When the Camel's temper, docility, strength, and capacity to endur thirst, are considered, it must be obvious that no mode of crossing th desert could be discovered, equal to that of a Camel carriage.

The best description of carriage for the purpose, would probably b something between a britska and a cab phaeton, made as light as po sible, with hood that will let down or close up entirely, and with dicki for servants before and behind, and room in the body, or under th dickies, for clothes and other baggage. On a good road such carria should of course be made with steel springs, but for crossing rou roads, I should think, that long springs of buffalo leather, like those us for the Caracollas in the Havannah, described in Alexander's trave would answer well. The wheels should be all of the same size, a five feet in diameter. I should think that carriages of the sort require might be built both cheaper and better in India than in Europe. C cutta built carriages are usually lighter than those imported, and t wheels are especially much lighter, and certainly stand the climate bett I have reason to believe that for 1,500 or 1,600 rupees, a carria of the above description, every way efficient, may be built in Calcutt

Three Camels per stage would be ample for such carriage, to take t passengers, their servants, and light baggage; and the distance fr Suez to Cairo being under eighty miles, four stages would suffice. Th relays would be necessary, and the journey might then be perform with safety and ease in twelve hours. These relays might be sent f ward from Suez, when the steamer was first signalized, and would th be ready to take forward the carriage, when the traveller reached relay station.

The Camel draws with perfect ease, and requires but little traini His pace is a long walk, or a long trot, and there is no unpleas motion of any sort imparted to the carriage by his movement. It not generally advisable to take a Camel in draught a longer stage t twenty miles, as when over-worked they are apt to lie down, and l not move; an unpleasant proceeding in mid-stage. But for eight miles they will trot readily and well. Camels for draught should highly fed, and it is a good plan, at the expiration of a stage, to g them half a seer of ghee; this if laid out in skins, they will lap up t once, and will then readily eat their grain or fodder; but otherw they will sometimes be off their food; and it cannot be too strongly pressed on all who employ the Camel in draught, that good feeding *sine quâ non* to ensure its efficiency.

The Camel men generally have a prejudice against employing Camels in draught. They say that the Camel was never intended to draw, but to carry, and look upon it as little less than a sin to put the animal into harness. They have further a prejudice, that it will kill the Camel: this is altogether fallacious. On a plain, the Camel draws with extraordinary ease, and a single Camel is fully equal to two and a half horses. It is not however so easy to combine Camel labour, as it is that of horses, i. e., it is less easy to make them pull quite steadily together; and four Camels are not equivalent to ten horses; I should estimate their power rather that of seven or eight horses. They do not draw very well up hill.

In India, the Rewarree Camels draw with the least training, because they are accustomed, in their own country, to draw the plough; and I should think the Egyptian Dromedary would draw equally well, for I think I remember to have read in some book of travels, that in Upper Egypt they are occasionally harnessed to the ferry boats.

The carriage should be built as light as is consistent with the union of strength and comfort, for it is far preferable to have a light carriage drawn by two Camels, than to have a heavy carriage with four Camels.

The Camel will draw a buggy well, but the buggy should be so balanced, like the ekkas, that but little weight may rest on the animal; and it must be borne in mind, that in consequence of the Camel's height, the shafts must necessarily have a considerable inclination upwards.

The bridle and saddle required for the Camel in draught, are precisely the same as those used for the common Sandees or Hurkaruh Camels of Upper India. On each side of the saddle however, and a little behind the legs of the rider, is an iron ring into which the hooks of the traces are looped. Around the neck of a Camel is a sort of breast-plate of broad tape or rope, which serves to keep the saddle steady in its position.

The traces are of male bamboo, with a hook at one end to hook into the ring on the saddle, and on the other a loop, like those of a leathern trace, to loop on to the carriage.

The Camels are harnessed in pairs. There is a pole like that used for horses, but its position is more upright, and which is buckled to the saddle, as it would be to the harness of a horse.

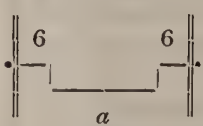
When four Camels, or three Camels are used, splinter bars are put on the top of the pole, and the front Camels are harnessed to them by traces in the same manner as the wheel Camels. Each Camel has a separate rider.

T. J. TAYLOR.

Calcutta, *April 15th*, 1839.

Extracts from Mr. WALNE's *letter of* 15*th June*, 1839.—*Dromedary Carriages.*

I now proceed to the question of Dromedary carriages. My attentio has for sometime been seriously turned to this subject, and thoug observation has quite convinced me that the Camel is a most usefu animal for draught, and may be turned to great account in taking acros the desert trucks loaded with coals, and other heavy articles, I hav hitherto felt rather less sanguine as to adapting Dromedaries (i. e. ligh Camels) to vehicles calculated to combine comfort with expeditio The difficulty attaches principally to the carriage, and the peculiar roa over which it has to pass, and is one, after all, which will doubtless b overcome by the ingenuity of the coach maker. Though a considerabl portion of the Suez desert is a hard gravelly plain, there are here an there broad bands of deep sand, over which an ordinary carriag cannot readily pass, whilst in other spots the road is so strong an rough as to defy the best springs, and put ease out of the question. is, in short, as nature has made it; and though art may do something t improve its condition, this line can never acquire the properties of good carriage road. To overcome these obstacles it is necessary tha the wheels should have a much greater diameter than those usuall employed, and in my proposals forwarded by the last steamer to th Honorable Court of Directors, I suggested, for the conveyance of coa a truck, or cart, with two wheels of nine feet diameter, the weigh being suspended from the axle, and the pole resting by a bar on th necks of two Camels. A carriage however for the conveyance o passengers, obviously requires four wheels, and as their diameter mus be not less than six feet, and should if possible be more, the whol vehicle will be apt to acquire rather an unwieldy form. The heigh however of the body from the ground may be diminished (though little at the expense of strength) by giving a dip or bend *a* to the axl



which, as well as the wheels, must be of wrough iron, and by placing the suspension (not curricl springs at the sides, 6 6. The pole must b adapted not only to the height of Dromedari as they stand, but also to their habit of occasio ally lying down, and the draught be on the hump and ribs of the animal the harness being similar to that of Major Pew's Artillery. The bod should of course be as light as is consistent with the requisite strengt have good arrangements for ventilation, and might contain comfortabl sitting room for eight persons, four inside, and two in a cabriolet div sion at either end. For a carriage of this kind, four Dromedaries will b necessary, and the journey being divided into four stages, each v

cle will require 16 animals. Taking the calculation at 13 carriages id 208 Dromedaries, the following will be the annual expense of the tter, reckoning beans at p. 60 the ardeb.

2,600 ardebs of beans, at 60, ...	p.	156,000	
374,400 Okes cut straw, ...	,,	37,440	
104 Feddans Berseem,...	41,600		
Rafeeahs, ...	1,000		
	,,	42,600	
52 Boys, at 35 p. month, ...	,,	22,560	
20 Men, at 60 ditto, ...	,,	15,120	
1 Nazir, at 300,...	,,	3,600	
Incidental expenses, say, ...	,,	2,680	
		280,000	£ 2,800

To render the Dromedaries serviceable for bringing passengers from uez, as well as conveying them to that place, it is requisite to add 52 romedaries (increasing the annual expense one fourth,) to be placed t the Suez station, at the same time doubling the number of carriages. he latter would, at each end of the journey, await the arrival of the llowing steamer, but for the intermediate time the animals should be ithdrawn from the stations to the neighbourhood of Cairo, where alone ey could be fed with economy, and be properly looked after.

For both mules and dromedaries there must be some expense attening the carriage of beans to Suez, and there may also be an occasional utlay for water at the stations in the desert. In the event of the former eing employed, each mule would, on ordinary occasions, carry a bag of eans and a small *girbeh* of water, sufficient for the 30 hours passed in he desert; and if carriages be adopted, the dromedaries sent forward or relays will take with them a quantity of beans and straw sufficient or the journey. In either case the detention of the animals at Suez hould be as short as possible, not only on account of the great additinal expense of feeding them there, but the bad condition which is apt o result from the continued use of brackish water.

In the above estimates I have only calculated the number of animals, whether mules or dromedaries, required for the transit of 100 passengers, but I need not observe that to provide for casualties a larger establishment would be required. The clover season too, in which the whole tud must be turned out, will give rise to some inconvenience, that nust be anticipated and provided for.

It will have been seen, by a comparison of the two estimates, that in he annual expense of keeping mules for sedans, and dromedaries for

carriages, there is no very material difference. The speed will, I cons der be nearly equal, and I question if in either mode the actual journe be in general performed in less than eighteen hours. Even in carriag I presume the travellers, particularly ladies, would gladly avail then selves of ten or twelve hours rest at the stations, and as the departu of the steamer must be regulated by the arrival of the cargo and ba gage, no advantage would be gained by compelling passengers to hur through a journey, that must, under the most favourable circumstance be sufficiently fatiguing. As however the advantages and disadvant ges of either scheme can only be judged of by experience, the be advice I can give the Committee is to direct comparative experimen on the *actual road*, to be made and reported on a rough carriage, th might afterwards serve as a break; and a sedan frame, four dromed ries and two mules, are all that would be required, and a series of tria made for a few weeks, and at a trifling outlay, would set the question rest, and enable the Committee to adopt a plan that need not entail t expense of subsequent alterations.

The freight of coal from Alexandria to Cairo is, in native boats, 6 ton, and the landing, stowing, and subsequent transfer to the steame will cost about one more. The latter charge is the mere cost of Ar labour, and is distinct from the annual expense of a clerk, weighe gate-keepers, &c., which, with proper management, might be serviceab in the baggage and cargo department, as well as in the coal depôt, provi ed the latter be limited to the supply of the Nile steamers. In the eve however of there being a depôt, on a large scale, connected with t transfer of coals to Suez, the establishment should be entirely separat

If by employing large steamers coaled at Aden, the depôt at Su can be dispensed with, doubtless there will be a great advantage to t Company in such an arrangement. The business of the Egypti Agency, already sufficiently comprehensive, will be proportionate lighter, and probably a great annual expense will be avoided.

In my letter to Mr. Greenlaw, dated 17th December, I offered estimate of the expense of delivering coal, which was at that time fro Alexandria to Suez about 2*l.* a ton. A recent rise in Camel hire h added nearly 10 per cent. to the cost as then calculated; so that the ca riage of coals by hired Camels, particularly where so large a quantity 10,000 tons is required, has less to recommend it than formerly. A immense saving may however be effected by the adoption of the Cam suspension truck, to which I have already alluded, and I calculate th coal may be put on board at Suez for about 1*l.* 13*s.*, exclusive of t cost of delivery by contract (at present 2*l.*,) at Alexandria. T

ıns and estimates connected with this subject are now before the ›norable Court of Directors, and I leave it to the Committee to use ir influence, in obtaining from that source, the information I have mmunicated, and which is I believe of sufficient interest to merit -ir attention.

(Signed) ALFRED S. WALNE.

Her Majesty's Vice-Consulate, Cairo, 5th July, 1839.

Sir,—I have the honor to acknowledge receipt of your letter of the th April, containing copy of a paper on Camel carriages, communited by Mr. T. J. Taylor to the Committee of the New Bengal Steam nd.

In my letter to Capt. Barber, of which the above is a copy, I have tered somewhat at length into the question of Dromedary carriages, l before the departure of the next English Steamer, I shall, in comance with your request, send him a few observations on Mr. Taylor's cellent paper, the perusal of which has interested me much, and ›rded me some hints that may prove extremely useful.

I am sorry that I cannot forward you a copy of my proposals for the rriage of coals, in high wheeled carts, drawn by Camels; but having used them to be laid before the Court of Directors, I thought it best limit myself to advising Capt. Barber as to the source from which he uld obtain the information I had furnished.

I was enabled to obtain from Capt. Graham, who accompanied the ephants to Cairo, a general idea of Major Pew's Camel Artillery, t if the Committee would do me the favor to furnish me with a sketch the harness in detail, I should feel particularly obliged.

(Signed) ALFRED S. WALNE.

B. Greenlaw, Esq.
ec. N. B. S. Fund.

ART. VII.—*Account of a Journey from Sumbulpúr to Mednipú through the Forests of Orissa. By* LIEUT. M. KITTOE.

(*Continued from page* 480.)

May 28th. I resumed my march at half-past 2 A. M.; the mor ing was very clear, and sufficiently light for me to see as much was necessary after my observations the previous evening.

I had almost forgotten to mention, that yesterday evening a ve intelligent person from Lehra had given me a good deal of informatio which, if quite correct, would be very valuable. Having learnt fro me the ghat I was proceeding to in the Keunjur hills, he told me th I had come much too far south, that I ought to have continued d east from Sonamoonda, where I had turned southward, and ha crossed the river at Barakôt, a place at the foot of the hills betwe which it flows by a very narrow pass, and that from thence to t mountain chain, the path was direct and tolerably good; he adde that it led to a pass that had not yet been examined, and which is i very good direction.

In consequence of this information I determined to regain the p per line by avoiding Lehra, and proceeding direct to a place call Goorsunk, distant fourteen and a quarter miles. On first starting I w through the village and then descended into the bed of the river, whi I crossed in a direction slightly diagonal, passing over several island the distance across was half a mile. The gravel in the river's l consists chiefly of granite, gneiss, quartz, and much jasper of variega colors. I could not discover the slightest trace of coal, so that I f the more positive of the correctness of a former conjecture of mi that the coal measures are confined to the country below the gn and granite formation, extending along the northern boundary Tálcher, Ungool, and Rehrakôl.

Having reached the opposite bank I travelled in a north-easterly rection over tracts of very rich soil, with an equal proportion of jungle cultivation, till I reached a large village amidst beautiful mango to called Hunnaum, distant one and a quarter miles from Barsi from hence to another respectable place called Bumpúra, nine m further on. I passed through a thin forest of saul with occasional pate of cultivation, the path inclining more to the eastward than before; soil is exceedingly rich, consequently the heavy rain of the previ evening had rendered the road very muddy and difficult to travel o in this there was one advantage, for it shewed the necessity of me ling, should the road pass this way. It is really lamentable to such fine lands left uncultivated.

Three miles and seven furlongs beyond Bumpúra, I reached my camping ground at Goorsunk; most of the huts in the village were falling to ruins, one third of the population having perished from famine and cholera the previous year; it is situated at the entrance of a narrow pass between two low ranges of hills, and is surrounded with fine topes, in one of which I spread my carpets and made myself snug for the day.

While passing through the forest a peculiar sound attracted my attention, it was like that of a wooden ball dropped on a board and allowed to vibrate; I at first thought it might be a woodpecker, as it proceeded from the top of a lofty and withered tree, but upon inquiry was told that it was a kind of frog which inhabited the trees (the tree frog?) and that its call was a sure harbinger of rain;* it is considered venomous, indeed that its bite is certain death. I regret that I could not obtain a specimen; its color is said to be dark with white spots. At this place I remarked a number of stones placed in the same manner as the druidical monuments (such as the Kitseotty house near Boxley in Kent) viz., three set upright, with one on the top of them, the dimensions of these are however very small, and have the appearance of a number of three legged stools. A custom prevails in these parts, of relatives collecting the ashes and bones of the deceased, and after burying them, placing stones over the spots in the manner above described.

Before my arrival the male part of the small population had fled to the jungles, leaving their better halves to protect themselves and property as they best could. It is a common practice throughout these provinces; the instant strangers are perceived, off the people run (as if their lives were at stake) and are hid in the depths of the jungle in a moment,—it is to facilitate their escape that the jungle is never entirely cleared near the villages; a narrow belt connected with the forest is usually to be found. I forbade my followers leaving camp in order to prevent pilfering; the villagers returned towards the afternoon, and crowded round me to see what description of being the Sahib was, never having beheld a white man before.

The view from Goorsunk is very confined, the place being situated in a hollow; to the eastward rise the Keunjur mountains over which I was to pass, they appear to be near 2,000 feet, and are thickly studded with trees. To the southward the Malagir mountain is distinctly visible above

* I have since heard many, and am inclined to think that these reptiles do not call except on the near approach of and during wet weather, as I have never heard them at any other time.—M. K.

the range of low hills; this mountain is reckoned the highest in Oriss the people assert that there is frost ("pala") on its summit all t year round, and that the cold in the winter months is very great; t latter assertion I can easily credit, for it cannot be less than 4,000 f above the level of the sea, perhaps more. I hope at some future peri to be able to measure its height, and to learn more concerning it, for all accounts be true, it would be a delightful and salubrious locali for the residence of any European functionary appointed to presi over these ill-governed and ill-fated states. There is a "gurh" stockade on a shelf of land two-thirds of the way up the mountain on northern face; there is said to be a fine tank and beautiful groves orange* and other fruit trees; the position is considered very strong, a has for many years been resorted to as the place of refuge, (in case attack) of the Lehrapal Zemindar. The estate of Lehra was formerly o of the eighteen dependencies of Sumbulpúr, as I have before said; b some years ago, the uncle of the present Zemindar willed his estate to t Keunjur Raja, or rather gave it to him as a dowry on the marriage his daughter (an only child.) This questionable act has led, as may w be supposed, to continual feuds between the two powers, the Zem dar refusing to pay the homage required by the Keunjur Raja, a the latter refusing to accept the tribute (which amounts to 250 Rup per annum) unless the former consents to attend once a year at t Keunjur durbar, and there present a nuzzur together with tribute, dressed in woman's attire, i. e. a Sarí and Chúrís (bangl on his arms, and in this condition prostrate himself at the Raja's f This the Lehra chief has from the first refused to do.

It is said that the former Rajas of Lehra used to hold their estate this particular tenure from the Rajas of Sumbulpúr, but that t practice had long since been discontinued. Most of the mi "gurhs" were originally held on the like curious tenures, and so even still more absurd, for instance the adjacent state of Rehrak the Zemindar used to perform (once a year) what was termed "Muggur loth" or alligator's roll, when attending with his tribute his lord (Sumbulpúr). The ceremony is thus described:—the Z mindar besmeared himself with mud, and when arrived within stipulated distance he had to lie down and roll along the ground that condition to the Raja's feet, which he saluted, his nuzzur was t accepted and he was allowed to rise.

In consequence of the above mentioned difference between t

* The states of Talcher, Rehrakôl, and Lehra are famous for oranges of a su size, but very sweet.

ehra and Kennjur Rajas, the former sent two trustworthy persons
confer with me on the subject; I listened to their story, but as I
ad no power to interfere I declined giving any advice, except enjoin-
ng them to keep the peace, which I was informed the latter wished to
isturb.

I learnt the following from the vakeels—the difference between the
vo states had existed for many years; at first Colonel Gilbert (the
overnor General's Agent) visited Lehra to inquire into the case, he
irected the Keunjur Raja to remove his paik thannas out of Lehra
ntil the dispute between the parties was amicably adjusted; up to
iat period the tribute had been paid to Sumbulpúr, but since then
ie Lehra man had regularly offered it to him of Keunjur, who has
ivariably refused to receive it unless the former consents to perform
ie degrading ceremony.

The tribute has been regularly placed in the treasury of Lehra, and
as consequently accumulated to some thousands of rupees, which the
Zemindar said he was willing to pay either to Keunjur or to the British
Government, but will sooner forfeit his life than humble himself as
equired;* the vakeels said that the Commissioner of Cuttack had re-
ised to accept the tribute, and had ordered their master to submit to
Keunjur, they added that they would do any thing I would order
hort of the degradation required.

This case shews perhaps the necessity of the political officers occa-
ionally visiting the different mehauls; much good would result from
t in various ways; but such is the multiplicity of duty which they
re at present saddled with, that they have but barely time to attend to
he more immediate and urgent duties of the country under our own re-
ulations; added to which the stations of the two (present) authorities,
iz. the Governor General's Agent, south-west frontier at Kishenpúr
ear Hazaribaug, and the Commissioner at Cuttack, are both upwards
f one hundred miles removed.

Having dismissed the Lehra people, with promises that I would
ry and get the Keunjur Raja to come to amicable terms, (if I met
im) also to speak to the Commissioner, I proceeded to give the
Deogurh Mooktar his "rooksut" as I was now no longer in his dis-
rict; he complained loudly of the extortions and oppressive conduct
f some of the people who had attended on Capt. Abbott, and myself,

* In January of the present year when at Jotepur in Keunjur, I was informed that
he Raja was preparing for an attack on Lehra, having erroneously supposed that Mr.
B—. the Commissioner, sanctioned his so doing; and I was assured that my presence
nly had induced them to suspend hostilities which they intended to re-commence when
I should have left.

I took down his deposition in writing and determined to report the conduct, which I did subsequently;* a further complaint was mad of the oppressive conduct of one of the postmaster's jemadars, wh had been extorting money, right and left, under false pretences having been ordered to take the road first through one place then and ther; this individual had however lately been severely punished an discharged by Mr. B. who had heard of some of his pranks.

Being informed that the road in advance was very difficult an rugged, I thought it prudent not to push on in the evening as I ha at first intended, so I passed the night at Goorsunk.

May 29th. Started this morning at half-past three and reache Tungoora at the top of the ghat at 10 A. M. after a most fatiguin march up and down hill for twelve and a half miles (by my peram bulator) but by a previous measurement made by one of Mr. B—— people it was much less,† the whole ascent being only 1,800 fe in all. This must however be an error, as the least, actual height Tungoora above Goorsunk must be from 1,800 to 2,000 feet; th difference of atmosphere and of the range of the thermometer clearl indicates it; the latter was ten degrees below the range at Barsin and Goorsunk, and it must I should think be at least fifteen degre below the usual range in the country below. The Malagir mountai (which is seen in all its grandeur from hence) appears to be cons derably higher, therefore the thermometer at the hottest season rang perhaps at six or eight degrees less still, which would make it desirable spot for a sanatarium.

The road from Goorsunk as far as the village of Mandarah—si miles and a quarter—has a direction slightly northerly; there are man small watercourses and much uneven ground, also two large nulla over which rope bridges would be requisite, but it appeared to m that a much more favorable line could be laid down and innumerabl windings avoided, also many watercourses. From Mandarah th bearing of the valley from which the ghats (viz. Tungoora an Muttíghattí) branch off is 60° south; I proceeded up the elevate ground in the centre of this valley, till a little beyond the village Rungaree, at five miles and six furlongs I crossed a deep nulla an turning due north entered a narrow branch valley with a wate course down its centre, at this spot the path to the Muttíghat

* Major W—. I believe attempted to inquire into this matter, but was unable t gather the witnesses; these people would sacrifice any thing rather than leave the homes and venture before our cutcheries, however kind the European officer.

† I subsequently found that I had been led by another path the worst of all.

ontinued in a south-east direction. At seven miles and one furlong I ached the first perceptible ascent, and at nine miles and one furlong ached the top of the first ghat which was tolerably steep, much ore so than necessary, as were the path to have an even ascent would be less fatiguing, but at its best it would be difficult for heeled carriages; the path runs along the edges of the watercourse, rossing occasionally from side to side, beyond this there is much entle ascent over good ground; the second, third, and fourth ascents are ery steep, but of no great duration, there are also several descents. If his ghat be adopted, the path must be judiciously managed so as o wind down by the edges of the watercourses; the greatest obstacle s the rocky nature of four out of five of the ascents, and of three-ourths of the whole distance; the stones could be thrown aside, but uch as could not be removed could also scarcely be blasted, as the ock is of the hardest quartz and granite; they might perhaps be roken with sledge hammers and wedges.

Nature offers a capital hint for protecting the inclined surfaces of oads in the hilly tracts from being washed away and cut into furrows, nd in many instances completely destroyed,—it is the effect produced y those trees which have fallen athwart the paths, likewise parallel o them; at these spots there are regular steps formed (as it were) and he intermediate spaces are quite level; whenever I have passed over ndulating lands (which are as ten to one) I have observed that paths re less cut up and much better when there are fallen trees.

The hills have a superstratum of stiff red marl, and many are culti-ated to the very peaks;* it has a lively appearance and bespeaks ndustry, for great labour must be bestowed in clearing these lands.

Tungoora is a large village surrounded with plantain gardens, it is n the Lehra zemindaree, and is supplied with good water from wo strong springs flowing down both to the north and south sides of he hill, several hundred feet below. The view from hence is very rand but confined, owing to the trees.

The jungle on this morning's march was the same as usual, rather canty but the trees very lofty, there are many wild mangoes along he ghat, the fruit is small and extremely acid.

The direction from the entrance of the ghat thus far, has been con-siderably north of east. Mr. B——'s road has never been surveyed, herefore the real direction is not known; I should not be surprised at

* From the specimens I have seen of the soils in which the tea plant grows, I should hink these tracts would prove favorable to its cultivation, I have already described he climate.—M. K.

finding it the proper one from Byega to Terentec, I shall be th better pleased as there will then be no necessity for going nea Keunjurgurh (which is far too much south,) and thereby all cause c discontent will be removed.

In the evening I ascended the highest spot of ground near th village, from whence I had a noble view of the country to the eas south, and west. The beautiful mountain described in yesterday journal is seen in all its grandeur, bearing south-east ; I took a roug sketch of it and the country below it. [See the plate.]

May 30th. Marched this morning at twenty minutes past 1 A. M and reached our ground at 7 o'clock, distance nine miles per peram bulator. I halted three times on the road, in all about an hour and half, to allow the palkee to come up ; I was led by a very rough pat but not so much as yesterday, for the descent upon the whole is mor gradual, with less jungle, and with care and ingenuity could b improved. I passed through three villages on the road ; the first (whic is deserted) at four miles and forty yards is called Keeragurh, the secon at six miles and one furlong, Sura,—this one is a good size, and the bour dary of Keunjur and Lehra, it is at the bottom of the ghat at the hea of a long valley. At eight miles one furlong and one hundred and eight yards I came to a large village in Keunjur called Turmagurl three-quarters of a mile beyond which, or nine miles from Tungoora, the small village of Ballera, both are in the centre of an extensiv valley (bearing east and west) which is almost entirely cleared c jungle, likewise several of the hills. During this morning's march searched in vain in the beds of all the nullas to find any traces c limestone rocks, the pebbles and boulders consisted generally of quart sienite, hornblende, felspar, greenstone, but no ores of any kind.

I saw but few birds, but observed a great variety of moths an butterflies of beautiful colors, and while resting under a tree I remarl ed a peculiar kind of stick worm, which formed a coat of fine strav and small pieces of bamboo leaves, the worm is about an inch and half long ; my attention was attracted to it by seeing a dry leaf trave ling along, there were many of them ; I was too fatigued to occupy m; self with collecting either any of these or of the moths and butterflie There seems to be always something new to learn, and to amuse tl traveller ; while resting, some of my people wanted to light their pipe but there was no fire, one of the coolies volunteered to produce som which he did by the following means :—the man searched for piece of dry bamboo which he split in half, and with a piece iron made a small hole in the centre of one of the joints on tl inside, he then cut a small switch of a peculiar kind of pitl

VIEW OF THE MOUNTAIN OF MALAGIR IN ORISSA, near LENRAGUM.

rub to a length of about a cubit, he pointed one end, then two en squatting down, one held down the joint of bamboo with his toes nd both of them spun the switch rapidly and constantly round be- veen their hands, the pointed end being put into the hole in the joint ie friction soon produced a blind heat which charred both pieces of ood, and eventually they took fire, the operation occupying about two inutes or less.

In the vallies, the soil is the same as that of the ghat. I was bliged to halt at this short distance on account of its having com- enced raining. This is certainly a delightful country and climate, I may judge from present observation the soil is capable of ny cultivation, and I should think that the tea plant would thrive, lso coffee and cotton.* The thermometer fell to seventy-five degrees st night and did not range above ninety-two degrees in the day- me; it cleared up at noon and there was a fine breeze which I was ld is constant there, the thermometer was only ninety degrees at oon. I took my abode this day in a cow-shed, on the floor of which had some fresh earth thrown and levelled, it was by no means an ncomfortable place, indeed the cattle sheds are the largest and best uilt huts to be found in the villages, and in the hot or in wet weather hey are far more comfortable than a tent in every respect, and twice s cool.

On my arrival this morning I met Mr. Babington's jemadar, who vas to have shewn me the road over the ghats, which he had repre- ented as so superior to all others that had been examined; after a ittle conversation I soon discovered what degree of trust was to be ut in his assertions, he was a very well informed man, and had tra- elled through every nook and corner in the Keunjur country in search f a better road than the present one, but like most natives he had but very poor idea of a straight line, or of the points of the compass; hence nuch of the trouble which Captain Abbott had to complain of.

I resumed my march at four P. M. and proceeded down the Turma alley towards the great hill under which, on its eastern base, is situa- ed the gurh and town of Keunjur. I was aware that the direction vas altogether wrong, but I was at the mercy of my guides and of the emadar above mentioned; they confessed that there was a better road n the direction I wished to proceed by, but that supplies had been prepared for me along the route they were leading me by, which had (they said) only one or two slight ghats.

* I should think that no doubt could exist as to the favorable nature of the soil of these tracts for the cultivation of any kinds of superior cotton.—M. H

After proceeding several miles down the valley, which inclines co siderably to the southward, I entered a narrow glen with large fore trees, I here came upon the road Capt. Abbott had surveyed, ve near to the village of Tillopussí, situated in another glen branc ing off to the westward, and leading to the Muttighat; I pr ceeded along this road towards the Byeturní river and valley, a reached the former long after dark, distance about six miles. Ju as the evening was closing I fell in with a huge bear and her tw half grown cubs, I had no fire arms loaded, therefore we hallooed a drove her off, the cubs clung to her back much in the same manner young monkeys do, only that they rolled about and did not seem hold so well. It was fortunate I had many people with me, othe wise she would most probably have attacked me; these brutes are f more mischievous and dangerous than tigers, for out of pure mischi they maul people in the most frightful manner, particularly the mango season when they frequently take possession of a garde and defy all attempts of the villagers to drive them out.

Just before reaching the Byeturní, I passed a rather large villa called Colesaie, inhabited by Coles, a number of whom have late located themselves in these hills by the Raja's invitation, (it is sai with a view to employing these savages in ransacking Lehra whenev a fair opportunity may offer itself. I had some difficulty in procuring guide from among these, for they refused to come, and seem inclined to resist us,—we succeeded in catching one surly creatur whom we with much difficulty compelled to shew us the way. Ha ing crossed the Byeturní (the Styx of the Hindus, which is he nothing but an insignificant rivulet thirty yards wide, with scarcely a water) I resolved on encamping for the night, for I could not trust m Cole guide, whom I dismissed;—we lighted fires in all directions a went to sleep.

I should here remark that the Byeturní takes its rise in the adj cent hills about eight or ten miles further south, and winds along u der the hills in a northerly direction for many miles, entering Sing boom and then turning to the east for a short distance, when it final flows towards the south through Keunjur and Dekkenal into t plains of Orissa; in Rennel's map it is erroneously made to take i rise to the north of Singhboom. The source of the Byeturní, as well the river itself is held sacred; it is said to issue from a huge mass rock the shape of a cow's head, and that water flows from one nost and sand from the other; a large fair is held there once every yea there are moreover places of worship with idols at every five coss (t to twelve miles) from the source down to the holy city of Jājipūr the plains.

May 31st. I resumed my march at twilight, and did not reach uddoogurh till past 11 A. M. On first starting, there was a gradual cent from the river, the path passing through thin jungle along the base some small hills to my left (north), the country to my right was en and undulating, with many villages and much cultivation; the igh hill of Keunjur, called Baghtunga, was right in front; to the estward rose the beautiful range of hills I had just left;—the land-ape was truly beautiful. Some of the smaller hills are cultivated their very top, apparently with cotton, which ought to thrive well such soil.

Having reached a pretty village called Coomírí, midway up the orthern edge of this beautiful village, I had to turn to the northward nd descend into a deep glen, then to re-ascend a rather steep slope rewed with masses of iron clay and iron ore, from thence I passed hrough a thin forest over a succession of undulations and ascents, more r less steep and difficult, up the north-west face of the mountain. The ath, which is very narrow, after winding round it descends for one nd a half miles inclining first to the eastward, again to the north-ard of east; it is excellent for the whole descent, but it is only three et wide, and is neither calculated for carriages nor cattle, nor for a awk road, I was therefore at a loss to find a reason for Mr. Babing-on's servant having ever recommended it for the dawk to travel by; n reaching my camp I was very angry with the man, which led to n attempt on his part to explain why I had been thus deceived and arassed,—suffice it to say that I discovered that there had been much icanery on the part of the Raja's people as well as the postmaster's, was this very ghat that poor Capt. Abbott had refused to travel er, and well he might.

Having travelled compass in hand, making occasional sketches, I und that I had been led twenty-two miles, (from Bullera,) in a urse which proved to be nearly semicircular, instead of a direct line; was evident from my observations at Kuddoogurh that I should have ntinued nearly due east from Bullera, I should then have come rect upon one of the dawk stations called Kalleapāl and have conti-ued along the dawk road, the direction of which is very straight as r as Gorapursa in Mohurbhunj.

I had a fine view of the surrounding country from the top of the ountain, the Buddaum pahar (hill) of the Baumunghattí range ifty miles east) was distinctly visible, the country between it and the eunjur hills is tolerably level except to the north towards Kātkarin-h, where the old road used to run, there are numerous hills in at direction; it was quite evident that the road must be made direct

from the pass near Kalleapal to that to the southward of Buddaum p
har near Jushpur, in which case the present dawk road would be le
entirely to the left (or north), and Keunjurgurh, where the Raja reside
would be left about eight miles to the southward, thereby all troub
to us, and annoyance to the Raja, would be at an end, for in verity,
appeared that the great desire to prevent the road passing throu
or near the gurh, was the great cause of all the mischief which h
arisen; the Raja's dewan, who had come with a letter of complimen
from his master, was overjoyed when I assured him that such was th
case.

There being no hut available in the miserable hamlet
Kuddoogurh, I was obliged to take shelter under a small tree (for the
were none of any size); the day was exceedingly hot, therefore
suffered a great deal. I felt very uneasy both for my own safety an
that of my followers; we had the very worst of water, nearly putri
and the cholera was sweeping away hundreds. The Raja had tw
days previously lost his mother, his eldest son, and a nephew by th
dreadful scourge. We were all too much fatigued to be able to marc
again in the evening, so we passed the night where we were.

The Raja sent all kinds of supplies his town could afford, and in
sisted on my accepting all as my feast; I thought it prudent to humou
him, for my offering payment would have been looked upon as un
friendly.

1st June. Having resolved on making a long march to the banks
the Byeturní, where I was sure of getting good water, I broke groun
at 2 A. M. The road was good but very tortuous leading from villag
to village, sometimes to the north of the true line, at others to th
south; the country is high and undulating, with many rocky em
nences of grey granite which in many places protrudes through th
surface, having the appearance of extensive pavements; there appea
to be (generally) but a very thin stratum of soil for there are but fe
trees of any size, the most common is the pullas (*butea frondosa*) an
a large shrub with a pretty white blossom, having an overpowerin
sweet odour which the natives are very fond of, they put it i
their hair and through their ear-rings.

I travelled by many comfortable looking villages on my way; th
proportion of jungle to cultivation is perhaps as five to one. Th
largest village I passed through was Phoolkonlaie,* about two mil
before reaching camp. This place is a Sassun or Brahmun colony

* It was from this place that I was driven back by sickness in January of the pr
sent year.

herefore the cultivation is extensive and superior, for the Brahmuns roughout Orissa possess the pick of the lands; there is much fine gar-cane grown here.

Mungulpoor,* where I encamped, is twenty-two miles from last round by the road, it is a miserable hamlet belonging to weavers Tauntís) it is on the banks of the river, which is here 300 feet wide.

I encamped in a mango grove and passed another hot day, and in he evening was prevented continuing my march owing to a violent orm of wind, hail, and rain, accompanied by the most fearful thunder nd lightning I ever witnessed; it came on at 6 P. M. I had no shelter ut my palkee, which I took the precaution of having placed on some igh ground near the huts and raised on four large boulders brought om the bed of the river; many large trees were struck with lightning, nd others blown down, it cleared up about half past eight P. M., when he Raja's vakeels came, and had a very long conversation about he road, and unpleasant matter connected with it; I was however onvinced that the Raja was not so much to blame as my predecessor ad imagined, indeed it was my firm conviction that he had just eason to complain himself.

About 11 P. M. the sentry warned me of the approach of another torm—I resolved on braving it where I was; it soon came on, and wice as severe as the first; nothing could be more frightful than the ightning, and the peals of thunder made the very ground vibrate, it was truly awful, the rain poured in torrents; I lighted a candle to relieve my eyes from the glare of the lightning, and made up my mind for the worst; I did not expect to see the light of another day; I wrote a short memorandum in the shape of a will, and then fell asleep; the storm did not clear off till 2 A. M.

At a very early hour my visitors from Keunjur returned, and intreated me in the most earnest manner to accept the presents their master (the Raja) had sent me; they had the previous evening sent me word by one of my servants (a Brahmin) that they were prepared to pay me handsomely if I would insure that the road should not pass through Keunjurgurh, or any where near it, and that if I would take it out of their district they would even give more;—they alluded to this, and said that at any rate I must accept of what they had brought, otherwise the Raja would not think me sincere in my assurance; I however was determined on refusing, and reminded them of the orders of government, which they must be fully aware of. They still persevered, nor would they be satisfied till I promised to send a letter

* The survey this year was closed here, after halting for five days on account of the incessant rain; every soul was seized with fever.

from next camp to the Raja. This was sad want of faith, and clear demonstration of the poor opinion they have of European in grity. I tried to ascertain the amount which the Raja had paid, I could not get at the real truth, though it was evident it must h been much; I repeated my assurances that there was no chance of road passing near Keunjur, and stated that the Raja would be v wrong if he gave a single farthing more, and I requested that he wo complain of any person who might in future make any such deman

The vakeel complained loudly of the trouble, expense, and ha ships, their master and his ryots had been put to, by the const cutting of jungle, and exploring and opening new roads by the pc master's moonshís; however much exaggeration there may be, it evident that these worthies have certainly much abused their pow and have lived (together with their servants) gratis on the fat of t land, I resolved on putting a final stop to this source of annoyance, requesting the Raja to refuse to do any thing more, unless he receiv positive instructions from the proper authorities.

At sunrise I commenced my march towards Gorapursa, a da station twelve miles distant; I first crossed the Byeturní which w fast rising, and was attended to the opposite bank (the boundary Mohurbhunj) by the vakeels and their followers, who were th dismissed, I reached Gorapursa at 10 A. M.; the country I passed ov had a gradual rise the whole way with several light undulatio there appeared to be much heavy jungle to the right of the roa but in its immediate vicinity there is a fair proportion of clear a cultivated land. I passed one large village called Sukroorí two mil before reaching that of Terentí, where there is a dawk station; fro thence to Gorapursa there is one continued forest of small trees and u derwood, the distance is about seven miles, and Terentí above six fro the Byturní; four miles beyond Terentí I crossed the Krère Bundu river, this water was about two and a half feet deep, and running ve rapidly, the bed is gravelly and the banks exceedingly steep.

I encamped under a noble banyan tree and passed a pleasant da for the air was very much cooled by the previous night's rain, th country in the immediate vicinity is also high and tolerably open, n vertheless it is dreadfully unhealthy; there is a guard of a nati officer and thirty men from the Ramgurh battalion stationed here, suffers much, there are seldom more than one-third of the men fit f duty, the rest being laid up with fever; I found the native officer to b a very well informed man, he was very attentive to my wants an gave me much valuable information; I got him to write a letter to th Raja of Keunjur at my direction, touching his offer of bribes, and sen

off by the messenger who had accompanied me from Gobindpúr. considered it advisable to have some respectable witness to this unleasant business, for many good reasons.

I was about to resume my march at 5 P. M. when a dark northest horizon indicated the approach of more bad weather; a range of ew huts had just been completed, I removed my palkee &c. into the rgest which was also the most sheltered, it was that of my attentive ost, the native officer; I had barely time to remove when a fearful urricane came on accompanied with heavy rain, and hail stones of reat size; almost every hut was blown down, or so much out of the erpendicular that they were rendered useless, the water was ancle eep; I had taken the precaution to place my palkee on four large ones, so that I escaped the wet; the storm lasted till near midnight ontinuing more or less violent; I was more fortunate than I had been ie previous night, and felt grateful for such shelter.

3rd June. I was unable to march before sunrise for want of oolies; I then started onwards for Nowagaon, the second dawk stage in dvance; I had a very unpleasant trip, owing to the muddy state of the reater part of the road, my progress was very slow, not reaching my round till one P. M.; the distance travelled sixteen miles, the direcion of the road was slightly to the southward of east, the country unulating as usual. For three or four miles it runs through a thin ungle, and then enters the clear land in the vicinity of the Buddaum pahar and of Jushpurgurh, at the eighth mile I reached a arge village called Maldapursa, I rested here and breakfasted, after aking the compass bearings and sketching the features of the country; then proceeded on my journey,—the first mile or more is over the lain, the road then crosses the continuation of the Buddaum chain f hills, which ends three miles to the south-west by Jushpur; there re three rugged ascents, and as many descents, they are impassable for attle (laden) therefore very difficult for a palkee to be carried by, walked the whole way, I was informed that there was a passage ound these hills by which the ghat, which is called "Tinderí ghat" an be avoided; in my travels this year I have proved this to be corect, I shall allude to the subject in a future page. From the ghat within a few hundred yards of Nowagaon, the forest is very heavy, ut the road is good.

I shall not say more of Nowagaon at present than that it is near ie western extremity of a long narrow and once thickly populated alley in the zemindarí of Baumunghattí, the whole of which is ow a vast forest, having been devastated during the Cole insurrection onsequent on the difference which existed between Narindra Maha-

patur, Zemindar of the Purgunnah, and his lord the Mohurbhunj Raja; there are about twenty-eight miles of dawk road down the valley, and four dawk stages, viz. Nowagaon, where I encamped, Arjunbilla, Pooranapáni, and Kurrumbilla, this last place is at the eastern extremity at the top of the Nittai Maunghur ghat by which you descend to the plains.

I left Nowagaon before sunset, and pushed on to Pooranapáni, where I rested part of the night; I had much difficulty in procuring even a couple of coolies to replace two who had escaped, in consequence of this I discovered another piece of impudent roguery of one of the Cuttack myrmidons, a servant of mine having peached against him, it was this;—I had tried all manner of means to prevent him from pilfering as he passed through the villages, he had however managed to collect a heavy cooly load of bows, arrows, banghy sticks, latties (walking clubs) and fowls, added to these a charpoy, this I took away during his absence, and threw it into a thicket, the former articles I hid in the thatches of the huts, took the cooly for myself, and marched on.

About three A. M. of the 4th June, I continued my journey, reaching Bissái, a large village three miles from Pooranapáni, at day break. I here changed coolies, and proceeded on to Nowagaon Oopurbaugh which place I reached at noon, having travelled forty-nine miles, within little more than twenty-four hours; at four P. M. I resumed my march towards Seersa, on the banks of the Subunrecka, which place I reached a little after sunset; the distance was only five miles, but I was detained for an hour in a large village owing to a severe north-wester; I found my dawk ready, and bidding farewell to the jungles started for Mednipúr, which station I reached the following morning; I rested there during the day, and continued on my dawk trip to Oolooberriah, arriving at ten A. M; having procured a boat I left this place by water and reached Calcutta at sunset; thus ended my labours for the year 1838, having from the 16th December previous up to the 5th of June, travelled upwards of 2100 miles.

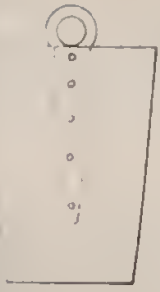
Having passed so rapidly from Gorapursa to Mednípúr I could not observe much, I have this year reconnoitred all this tract of country in the course of my survey duties, I shall therefore conclude with a few marks on its features and capabilities.

(To be continued.)

Day of the Month	Moon's Phases	Minimum Temperature observed at Sun-rise.						Maximum Pressure observed at 9 H. 50 M.						Observations made at Apparent Noon.					
		Barometer.	Temperature. Of the Mercury.	Temperature. Of the Air.	Temperature. Of an Evapg. Surface.	Wind. Direction.	Aspect of the Sky.	Barometer.	Temperature. Of the Mercury.	Temperature. Of the Air	Temperature. Of an Evapg. Surface.	Wind. Direction.	Aspect of the Sky.	Barometer	Temperature. Of the Mercury.	Temperature. Of the Air.	Temperature. Of an Evapg. Surface.	Wind. Direction.	Aspect of the Sky.
1		29,600	81,9	80,8	80,0	Calm.	Cirro-strati.	29,630	84,6	87,5	83,5	S. W.	To the s. cir.str. lt. clds. interspersd.	29,616	86,4	89,0	84,5	S. W.	Cloudy (Cirro-strati)
2	(	,600	80,0	79,0	78,8	Calm.	Nimbi interspersed.	,610	81,6	80,0	79,0	wbs.vg	Overcast rain & squally.	,620	80,3	80,0	79,0	S. W.	Overcast raining
3		,522	80,2	80,0	79,5	Calm.	Cirro-starti.	,560	83,5	87,5	84,3	W. ..	Light clds. inclining to cum.	,544	85,5	89,0	85,2	S. W.	Cloudy.
4		..	..	..	..	..	....	,491	82,0	84,5	82,5	W. ..	Cloudy (Nimbi.)	,480	83,8	84,4	82,8	W. ..	Nimbi raining.
5		,474	80,0	79,0	79,0	S. W.	Nimbi interspersed	,510	81,5	81,0	80,8	S. W.	Overcast lt. Nimbi drizzly.	,510	82,9	85,0	82,5	W b S.	Light Nimbi.
6		,580	81,2	80,0	79,5	S. ..	Cloudy.	,630	83,2	85,0	82,2	S.....	Cloudy.	,618	82,8	83,2	81,5	S.....	Cloudy Nimbi Drizzling rain.
7		,630	81,5	81,9	81,0	Calm.	Cirro-strati.	,670	84,5	88,0	84,3	S.....	Partial Haze & fragts. of Clouds.	,660	86,1	89,0	84,8	S.....	Cumuli.
8		,640	81,9	81,5	81,0	S.....	Cirro-strati.	,689	84,9	88,0	84,7	S.....	Cloudy (Cumuli.)	,674	87,0	91,0	85,8	S.....	To the N. Cum-str. rest Cum.
9	●	,648	83,0	80,0	79,0	Calm.	Clear.	,670	85,0	89,5	84,8	S.....	Cumuli.	,660	86,4	90,8	85,0	S.....	Cumuli.
10		,650	82,9	81,8	79,9	Calm.	Clear.	,684	84,8	88,7	85,0	S. E.	Cumuli.	,678	86,9	91,0	84,9	S. E.	Cumuli.
11		,700	82,5	80,8	80,0	Calm.	Generally Clear.	,750	83,9	85,0	82,8	W b S	Cumuli.	,730	84,4	85,4	83,0	S.....	Cumuli.
12		,650	83,0	81,8	80,0	Calm.	Light Cirro-strati.	,704	83,0	85,6	81,5	S.....	On the Hor. Cum-strati.	,687	83,5	85,7	82,0	S.....	Clomly.
13		,657	82,4	82,5	81,0	S. ..	Nimbi Zenith Clear.	,700	82,0	85,5	81,8	S.....	Nimbi interspersed.	,687	83,3	84,5	82,5	S.....	Nimbi interspersed.
14		,682	82,5	82,5	81,2	S. ..	Nimbi interspersed.	,702	85,0	87,4	83,5	S.....	Misty. [Cumuli.	,696	86,8	89,0	83,2	s. high	Hazy and Misty.
15		,702	83,4	83,0	82,0	S. ..	Cirro-strati.	,740	85,5	88,4	83,9	S.....	Mists & lt clds. inclining to	,738	86,7	88,2	83,5	s. high	Light Clouds and Misty
16	)	,739	83,5	82,9	81,8	S. ..	Cloudy.	,790	84,0	86,0	82,7	S. W.	Cloudy.	,781	86,0	89,5	83,9	S b W.	Cirro-strati and Cumuli.
17		,700	83,3	82,5	82,0	Calm.	Cirro-strati.	,756	83,3	84,5	82,2	S. W.	Cloudy.	,748	84,5	86,0	83,0	S.....	Detached Clouds and Haze.
18		,680	82,5	82,1	81,0	S. ..	Cloudy.	,740	83,0	84,1	81,9	S. W.	Cumuli.	,722	83,8	86,5	82,5	S.....	Cumuli.
19		,684	82,6	82,5	81,5	Calm.	Generally Clear	,720	85,0	86,5	84,9	S.....	Clear.	,700	86,0	88,5	83,5	S.....	Clomly.
20		,686	82,6	82,0	81,2	Calm.	Generally Clear	,728	84,4	88,0	83,2	S. E.	Cumuli.	,726	84,8	89,5	83,5	S.....	To the N. Nimbi Zenith Clear.
21		,680	81,5	80,0	79,0	Calm.	Clear.	,730	83,5	85,0	82,2	S.....	Lt. Nimbi interspersed.	,710	85,0	86,8	82,5	S.....	Cloudy.
22		,656	81,8	80,8	80,0	Calm.	Light Nimbi interspersed	,700	83,5	85,0	81,5	S.....	Cloudy.	,688	80,9	81,0	79,8	S.....	Nimbus rain.
23		,614	82,0	81,5	80,5	Calm.	Cloudy.	,670	83,0	84,9	82,0	S. E.	Cloudy.	,660	82,8	83,9	81,2	S.....	Cloudy Nimbi.
24		,624	81,5	80,0	79,8	Calm.	Cloudy.	,676	80,8	80,9	79,9	S. E.	Cloudy (Nimbi.)	,672	81,9	83,0	81,2	S. E.	Cloudy.
25	○	,666	81,1	79,2	79,0	Calm.	Cirro-strati.	,684	80,5	81,0	80,3	S.....	Light Nimbi rain.	,690	82,8	83,9	81,3	Calm.	Cloudy.
26		,680	81,5	79,5	79,2	Calm.	Cirro-strati	,710	83,9	88,0	84,0	S.....	Cumuli and Cirro-strati	,696	86,5	90,0	81,8	S.....	Cumuli.
27		,618	82,0	80,0	79,5	Calm.	Cirro-strati	,686	84,4	88,9	84,5	S.....	Cumuli.	,670	86,5	91,5	85,9	S. E.	Cumuli.
28		,611	81,9	80,5	79,8	Calm.	Cirro-strati.	,674	85,0	86,1	83,2	S. E.	Cumuli.	,668	85,5	86,7	83,0	S. E.	Cumuli and Haze.
29		,600	81,8	80,8	79,9	Calm.	Cirro-strati.	,614	85,0	87,5	83,7	S.....	Clomly.	,650	83,2	88,1	81,4	S. E.	Cloudy Nimbi (gathering).
30		,589	81,5	80,0	79,5	Calm.	Generally Clear	,610	84,9	88,0	83,2	E. ..	Cumuli.	,639	87,5	91,2	86,1	E. ..	Cumuli.
31	(	,610	81,9	80,2	79,9	Calm.	Clear.	,666	84,5	89,0	85,0	S. E.	Cumuli.	,650	84,6	88,2	84,0	S.....	Haze on the Zenith.
Mean.		6,39	82,0	81,0	80,2			,677	83,7	86,0	82,9			,667	84,8	87,1	83,3		

Day of the Month.	Maximum Temperature observed at 2 H. 40 M.						Minimum Pressure observed at 4 P. M.						Observations made at Sun-set.						Rain Gauge.
	Barometer	Temperature. Of the Mercury.	Temperature. Of the Air.	Temperature. Of an Evapg. Surface	Therm. exposed to the rays of the sun.	Wind. Direction.	Aspect of the Sky.	Barometer.	Temperature. Of the Mercury.	Temperature. Of the Air.	Temperature. Of an Evapg. Surface.	Wind. Direction.	Aspect of the Sky.	Barometer.	Temperature. Of the Mercury.	Temperature. Of the Air.	Temperature. Of an Evapg Surface.	Wind. Direction.	Aspect of the Sky.	Lower.
1	29,561	86,9	91,3	85,0	108,3	S.....	Cumuli and partial Haze.	29,558	86,1	87,0	84,0	vy cldy	Heavy rain from the S. with a	29,560	83,0	81,9	79,5	Calm.	Cloudy Nimbi drizzly.	
2	,590	81,3	79,0	78,7	.....	S. W.	Overcast very cloudy raining.	,567	81,0	79,0	78,5	Calm.	Overcast raining. [squall	,567	80,9	79,0	78,3	Calm.	Overcast Nimbi.	2,26
3	,478	85,5	91,0	85,5	110,0	S. W.	Cum-str. very chly to the N.	,456	85,0	87,5	84,5	S. W.	Nimbi rain.	,464	82,8	81,5	81,0	Calm.	Nimbi.	0,23
4	,440	83,0	83,5	82,2	.....	W. ..	Overcast heavy rain	,430	81,0	79,0	79,0	W. ..	Overcast raining.	,446	81,5	79,5	79,0	Calm.	Nimbi interspersed.	
5	,480	83,5	85,0	83,0	.....	S.....	Cloudy (Nimbi.)	,476	83,7	85,4	83,0	S.....	Cloudy.	,488	82,8	81,9	81,2	S.....	Cloudy.	2,70
6	,490	84,0	87,0	83,5	104,8	S.....	Cumuli.	,573	81,5	87,2	83,2	S.....	Cumuli.	,580	82,5	82,0	81,5	Calm.	Cirro-strati.	
7	,620	85,7	88,0	84,0	.....	S.....	Cloudy.	,604	85,0	86,8	83,1	S.....	Cloudy.	,610	83,9	85,0	82,0	S.....	Cirro-strati zenith clear.	0,13
8	,619	87,4	92,1	86,0	121,0	S.....	Cumulo strati & Cumuli	,591	87,3	91,5	85,8	S.....	Cum.-str to the E. Nimbi.	,608	84,0	85,5	81,9	Calm.	Nimbi Heavy rain.	
9	,620	86,5	89,0	83,9	.....	S.....	Clomly (Nimbi.)	,620	84,9	85,2	83,0	e. b. s.	Nimbi drizzly and showery	,621	83,9	84,9	81,5	Calm.	Nimbi interspersed.	0,70
10	,614	86,5	90,0	84,9	.....	S. W.	Nimbi and Cumuli.	,630	83,5	84,8	81,8	Calm.	Nimbi interspd. [thunder.	,636	82,8	82,5	81,0	S.....	Lt. Nimbi interspersed.	0,20
11	,700	81,8	88,5	83,9	.....	S.....	Light Nimbi and Cumuli.	,684	84,0	86,8	82,8	S.....	Cumulo strati and Nimbi.	,692	83,3	83,8	82,0	Calm.	Cirro-strati.	0,72
12	,652	85,0	86,0	82,0	.....	S. W.	Clomly.	,648	83,5	85,1	81,7	S.....	Nimbi rain.	,654	82,9	83,6	81,5	S.....	Cirro-strati	0,30
13	,660	83,3	85,0	83,0	.....	S.....	Cloudy.	,611	83,9	86,0	83,0	S.....	Clomly.	,644	83,8	84,5	82,2	S.....	Cirro-strati.	0,60
14	,670	86,5	90,5	84,3	.....	S.....	Cloudy and Hazy. [of Clds.	,652	86,5	88,5	83,5	S.....	Hazy Cum.-str. on the Hor	,658	84,2	84,8	83,0	S.....	Cloudy (Cirro-strati.)	0,10
15	,716	86,8	89,0	83,0	101,9	S.....	Lt. haze on the Zenith & frgts.	,700	86,5	88,9	83,0	S.....	Lt. haze on the zenith & frgts. of	,708	84,0	85,0	82,9	S.....	Cirro-strati.	
16	,752	86,2	88,8	83,5	101,0	S.....	Cir.-Cum. Cir. str and partial	,740	86,0	87,5	83,2	S.....	Cirro. str. & partial haze. [Clds.	,746	83,8	84,5	82,8	Calm.	Cirro-strati zenith clear.	
17	,690	86,0	88,5	83,5	97,0	S.....	Hazy. [Haze.	,670	86,4	88,5	83,9	S.....	Detached Clouds.	,676	84,0	85,0	82,8	Calm.	Cirro-strati.	
18	,675	75,2	87,5	81,0	105,0	S. W.	Cumuli.	,650	85,0	88,0	84,0	S.....	Cumuli zenith Clear.	,656	84,5	85,6	83,0	Calm.	Cirro-strati,	
19	,662	86,0	86,5	83,0	.....	S.....	Cloudy.	,636	86,0	87,5	84,8	S.....	Cumuli zenith Clear.	,642	85,0	85,0	82,0	S.....	Cirro-strati zenith clear.	0,13
20	,690	81,5	86,5	82,0	.....	S.....	Clomly.	,666	83,6	85,0	81,1	w. b. s.	Clomly.	,666	83,0	83,5	81,0	Calm.	Lt. Nimbi & Cirro-strati.	
21	,689	83,5	84,8	82,5	.....	S.....	Clomly.	,667	83,9	86,0	83,1	S.....	Cir-strati.	,670	83,2	81,6	81,7	Calm.	Light Cirro-strati.	0,22
22	,651	83,5	84,9	81,2	.....	S. W.	Clomly.	,631	83,7	85,0	82,3	S. E..	Nimbi (showery.)	,630	82,5	82,5	80,8	Calm.	Cirro-strati.	0,12
23	,610	82,2	84,0	80,8	.....	Calm.	Overcast drizzly	,618	82,2	81,9	80,8	Calm.	Cloudy.	,621	82,0	81,9	80,5	Calm	Cirro-strati.	
24	,638	83,3	84,2	81,5	.....	S.....	Clomly raining.	,608	83,0	82,5	81,0	Calm.	Cloudy (Cir.-strati.)	,612	82,6	82,0	81,2	Calm.	Nimbi interspersed.	0,42
25	,672	83,0	83,5	81,8	.....	E. ..	Nimbi distt Thunder.	,676	82,8	83,2	81,5	S.....	Nimbi interspersed.	,680	82,2	82,9	81,0	S.....	Cirro-strati.	0,20
26	,653	85,8	89,9	84,7	103,0	S.....	Cumulo strati & Cumuli.	,620	84,3	88,0	85,2	S.....	Cum.-str. on the Horizon	,626	83,5	85,0	82,3	Calm.	Cirro-strati.	
27	,658	86,6	93,5	86,9	123,6	S.....	Cumuli.	,590	86,2	90,4	86,5	S.....	Cumuli zenith clear.	,598	85,0	85,5	83,2	Calm.	Cirro-strati.	
28	,602	83,7	90,0	84,9	.....	E. ..	Cumulo strati Thunder	,550	83,4	84,0	84,2	e. b. s	Nimbi drizzly.	,554	82,9	83,5	81,6	Calm.	Cirro-strati.	
29	,610	83,5	84,8	83,0	.....	Calm	Cloudy Nimbi (Thunder.)	,580	83,9	86,5	83,2	S.....	Cloudy.	,590	83,5	84,4	82,8	Calm.	Cloudy.	0,42
30	,591	84,1	86,0	83,5	.....	S. E.	Cloudy (Nimbi.)	,584	84,0	85,7	83,3	S. E.	Cumulo strati.	,590	83,8	85,0	83,0	Calm.	Cloudy.	
31	,606	84,9	89,0	85,8	100,9	Calm.	Cirro strati and Nimbi.	,590	84,4	87,5	84,7	S. E.	Cum-strati and Nimbi.	,596	83,5	86,2	83,5	S. E.	Nimbi interspersed.	
Mean.	,629	84,9	87,3	83,4	107,0			,610	84,4	86,0	82,9			,616	83,3	83,6	81,8			9,45

Tham used in Well Sinking



ring a

Fig 1

Fig 2 Phaora used in Well Sinking

A B

Section on A B

Native method of working the Tham

Fig 3

Canal method of working the Tham

Fig 4

Scale 1 an Inch to 1 Foot

Fig 1 and 2

For Journal of Asiatic Society

Capt Cunliffe del

Wells with Intervals

Fig 1

Wells ... Intervals

Fig 4

Fig 2

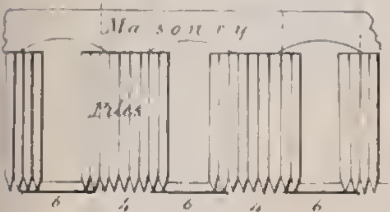


Fig 5

Fig 3

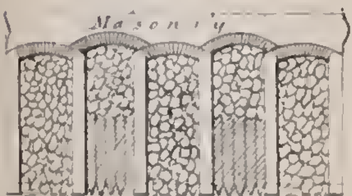
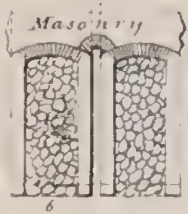


Fig 6



Neem Chuck or Well Curb

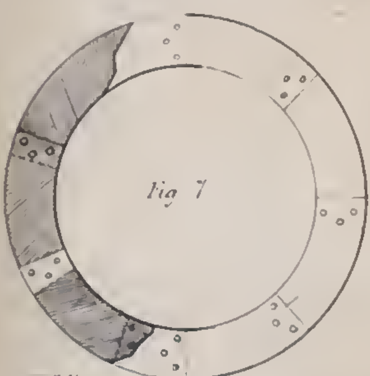


Fig 7

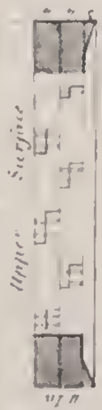


Fig 8